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ACETIC ACID AS A MENSTRUUM AND SOLVENT.

By Joseph P. Remington.

Any one who has delved, even moderately, into the pharmacy of the ancients, must have noticed the frequency with which the vinegar of that time was used as a solvent, but the nineteenth century has witnessed the gradual decline of the use of acetic acid in pharmacy.

The alcohol question, which is so perplexing, and which is still unsettled, furnishes a reason for diverting the attention of the pharmacist to some liquid which will, occasionally, take its place. The object of the following experiments is to determine whether acetic acid cannot be made to replace alcohol in at least some of the preparations now in common use.

The antiseptic power of acetic acid is frequently overlooked, and there is no question that the vinegars, if properly made, could advantageously replace many tinctures.

Slightly acidulated liquids are palatable to most patients, and these, when combined in prescriptions with syrups, are particularly acceptable, inasmuch as the acid counteracts the cloying sweetness of the syrups.

Then again, it is very desirable for physicians to have alternative preparations of the same drug to give to patients who are liable to become victims of the alcohol habit, and it cannot be denied that the prescribing of tinctures, elixirs and other alcoholic preparations have been the innocent means of working disaster.

The writer, four years ago, made a number of fluid extracts, using acetic acid in place of alcohol. These have been allowed to stand

alongside of others which have been made with alcohol, and most of them have proved their superiority. It is the intention to report upon these later.

It will at once occur to the reader that the presence of strong acetic acid in a fluid extract would be objectionable on account of its taste; but it can be shown that it is possible to evaporate the fluid extract at a very low temperature, thus getting rid of the acetic acid, and then re-dissolving a proper portion of the extract in a solvent. If this extract be standardized, a definite preparation is secured. It is true that a portion of the extractive seems to be rendered insoluble during the evaporation; but the experiments will show that this can be re-dissolved by varying the menstruum, and, in addition, it can be shown that this insoluble extractive usually represents inert substances.

In the following experiments the acetic extract of nux vomica was prepared with a 10 per cent. acetic acid, made by Dr. E. R. Squibb & Sons, and proved by assay to contain 15 per cent. of alkaloids.

These acetic extracts can be made dry and pulverulent, and to distinguish them the writer proposes for them the name of "Acetracts."

No. 1.—2 gm. acetract nux vomica, treated with 100 c.c. alcohol, sp. gr. ·819, yielded a light-colored tincture; the residue weighed 1·112 gm., and was not devoid of bitterness, plainly indicating that the alcohol was too strong.

No. 2.—2 gm. acetract nux vomica, treated with a menstruum of 75 c.c. alcohol and 25 c.c. water, yielded a residue weighing 0·502 gm. The residue was very slightly bitter and practically an inert substance. The tincture was limpid, transparent and of a dark amber color.

No. 3.—2 gm. acetract nux vomica, treated with a menstruum of 70 c.c. alcohol and 30 c.c. water, yielded a residue weighing 0·444 gm. This had a very slightly bitter taste, and was practically exhausted, producing a limpid, dark brownish-red liquid.

No. 4.—2 gm. acetract nux vomica, treated with a menstruum of 65 c.c. alcohol and 35 c.c. water, yielded a residue weighing 0·360 gm. The liquid was not clear, a fine, brownish-red precipitate making its appearance. The liquid could not be filtered satisfactorily, and a small portion which was filtered continued to let fall a precipitate.

No. 5.—2 gm. acetract nux vomica, treated with a menstruum of 60 c.c. alcohol and 40 c.c. water, yielded a residue weighing 0·410 gm. The liquid was not clear, filtering with great difficulty, the precipitate not settling.

No. 6.—2 gm. acetract nux vomica, treated with a menstruum of 55 c.c. alcohol and 45 c.c. water, yielded a residue weighing 0·340 gm. The liquid was not clear, filtering with great difficulty, the precipitate not settling.

No. 7.—2 gm. acetract nux vomica, treated with a menstruum of 50 c.c. alcohol and 50 c.c. water, yielded a residue weighing 0 320 gm. The liquid was muddy, precipitate not settling, and not easily filtered.

No. 8.—2 gm. acetract nux vomica, treated with a menstruum of 45 c.c. alcohol and 55 c.c. water, yielded a residue weighing 0·246 gm. Liquid cloudy, precipitate settling in three days, filtering with difficulty.

No. 9.—2 gm. acetract nux vomica, treated with a menstruum of 40 c.c. alcohol and 60 c.c. water, yielded a residue weighing 0·450 gm. Liquid muddy, not easily filtered. The addition of a little talc improved filtering.

No. 10.—2 gm. acetract nux vomica, treated with a menstruum of 35 c.c. alcohol and 65 c.c. water, yielded a residue weighing 0·338 gm. Liquid not clear; not easily filtered.

No. 11.—2 gm. acetract nux vomica, treated with a menstruum of 30 c.c. alcohol and 70 c.c. water, yielded a residue weighing 0·360 gm. Liquid not clear, filtered with difficulty, and filtrate does not remain clear.

No. 12.—2 gm. acetract nux vomica, treated with a menstruum of 25 c.c. alcohol and 75 c.c. water yielded a residue weighing 0·378 gm. Liquid not clear, but filtered more easily than No. 11.

No. 13.—2 gm. acetract nux vomica, treated with a menstruum of 20 c.c. alcohol and 80 c.c. water, yielded a residue weighing 0·476 gm. Liquid not quite clear, filters without much difficulty, but slowly.

No. 14.—2 gm. acetract nux vomica, treated with a menstruum of 15 c.c. alcohol and 85 c.c. water, yielded a residue weighing 0·426 gm. The liquid was not quite clear, but filtered fairly well.

No. 15.—2 gm. acetract nux vomica, treated with a menstruum of 10 c.c. alcohol and 90 c.c. water, yielded a residue weighing 0·376

gm. Liquid not clear, deposits some sediment, and showed evidence of decomposition ten days after preparation.

No. 16.—2 gm. acetract nux vomica, treated with a menstruum of 65 c.c. alcohol, 10 c.c. glycerin, and 25 c.c. water, left very slight residue, filtered easily and remained clear.

No. 17.—2 gm. acetract nux vomica, treated with a menstruum of 50 c.c. alcohol, 25 c.c. glycerin and 25 c.c. water, left very slight residue, filtered easily but slowly, and remained clear.

No. 18.—2 gm. acetract nux vomica, treated with a menstruum of 40 c.c. alcohol, 30 c.c. glycerin and 30 c.c. water, left very little residue, filtered easily, and remained clear.

No. 19.—2 gm. acetract nux vomica, treated with a menstruum of 20 c.c. alcohol, 20 c.c. glycerin and 60 c.c. water, left very slight residue, filtered very slowly, but clear.

No. 20.—2 gm. acetract nux vomica, treated with a menstruum of 10 c.c. alcohol, 10 c.c. glycerin and 80 c.c. water, left very slight residue, filtered easily, but not quite clear.

No. 21.—2 gm. acetract nux vomica, treated with a menstruum of 100 c.c. diluted acetic acid, and 1 gm. ground nux vomica added to the percolate to aid in filtration. The liquid was not quite clear.

No. 22.—1 gm. acetract nux vomica, treated with a menstruum of 100 c.c. diluted acetic acid, gave a liquid which was not easily filtered, but which remained clear.

No. 24.—2 gm. extract nux vomica, treated with 100 c.c. alcohol, left a residue 0·352 gm. The liquid was light-colored, filtered easily and remained perfectly clear.

No. 25.—2 gm. extract nux vomica, treated with a menstruum of 75 c.c. alcohol and 25 c.c. water, left a residue weighing 0·122 gm. The liquid was dark brownish-red, remaining perfectly clear, but throwing down a very slight dark precipitate after filtering.

No. 26.—2 gm. extract nux vomica, treated with a menstruum of 70 c.c. alcohol and 30 c.c. water, left a residue weighing 0·188 gm. The liquid remained clear after filtering, but with a slight precipitate.

No. 27.—2 gm. extract nux vomica, treated with a menstruum of 65 c.c. alcohol and 35 c.c. water, left a residue of 0·212 gm. The liquid was clear, a slight precipitate settling after the liquid was filtered.

No. 28.—2 gm. extract nux vomica, treated with a menstruum of

60 c c. alcohol and 40 c.c. water, left a residue of 0·232 gm. The liquid was clear.

No. 29.—2 gm. extract nux vomica, treated with a menstruum of 55 c.c. alcohol and 45 c.c. water, left a residue of 0·31 gm. The liquid was clear, a slight precipitate settling after filtration.

No. 30.—2 gm. extract nux vomica, treated with a menstruum of 50 c.c. alcohol and 50 c.c. water, left a residue of 0·316 gm. The liquid was not quite clear, a slight precipitate settling after filtration.

No. 31.—2 gm. extract nux vomica, treated with a menstruum of 45 c.c. alcohol and 55 c.c. water, left a residue of 0·31 gm. The liquid was not clear, a precipitate settling.

No. 32.—2 gm. extract nux vomica, treated with a menstruum of 45 c.c. alcohol and 60 c.c. water, left a residue of 0·342 gm. The liquid was cloudy, a very slight precipitate after filtration.

No. 33.—2 gm. extract nux vomica, treated with a menstruum of 35 c.c. alcohol and 65 c.c. water, left a residue of 0 40 gm. The liquid was cloudy.

No. 34.—2 gm. extract nux vomica, treated with a menstruum of 30 c.c. alcohol and 70 c.c. water, left a residue of 0·430 gm. The liquid was cloudy.

No. 35.—2 gm. extract nux vomica, treated with a menstruum of 25 c.c. alcohol and 75 c.c. water, left a residue of 0·40 gm. The liquid was cloudy.

No. 36.—2 gm. extract nux vomica, treated with a menstruum of 20 c.c. alcohol and 80 c.c. water, left a residue of 0·372 gm. The liquid was cloudy.

No. 37.—2 gm. extract nux vomica, treated with a menstruum of 15 c.c. alcohol and 85 c.c. water, left a residue of 0·420 gm. The liquid was cloudy.

No. 38.—2 gm. extract nux vomica, treated with a menstruum of 10 c.c. alcohol and 90 c.c. water. The residue not weighed. The liquid was not clear.

No. 39.—2 gm. extract nux vomica, dissolved in 100 c.c. water, left residue 0·40 gm. The liquid was muddy, and, upon standing, showed evidence of decomposition.

No. 40.—2 gm. extract nux vomica, dissolved in 100 c.c. diluted acetic acid. The liquid was a clear, light amber color.

No. 41.—2·4 gm. extract nux vomica, dissolved in 2,400 c.c.

diluted acetic acid. The liquid was clear and of a light amber color.

It will be observed that the object of these experiments is to ascertain whether acetic acid can advantageously replace alcohol in the extraction of a drug like nux vomica. The answer is decidedly in the affirmative. Acetic acid may be used for exhausting a drug known to be difficult to exhaust, like nux vomica.

A solid preparation can be made from it; this can be assayed and standardized, and the liquid preparations made by re-dissolving the solid in various mixtures of alcohol and water, with or without glycerin, and of different strengths of acetic acid.

If the proper menstruum be chosen, the residue will be inert, and may be filtered out. A number of other drugs have been exhausted with varying strengths of acetic acid, such as sanguinaria, kola, ipecac, squill, cinchona and colchicum seed.

A number of samples are presented, and especial attention is called to sanguinaria with acetic acid 60 per cent. This fluid extract has been made four years, and does not show the least sign of precipitation.

It, doubtless, would be just as satisfactory if made with U.S.P. acetic acid, and experiments are being conducted now, which will prove this view.

FRANGULA AND CASCARA BARKS.

TO DISTINGUISH BETWEEN RHAMNUS PURSHIANA AND RHAMNUS FRANGULA, AND TO EXCLUDE RHAMNUS CALIFORNICA, IN THE STATE OF POWDER,

By L. E. Sayre,

Member of the Research Committee C, of the Committee of Revision of the United States Pharmacopœia.

One of the problems submitted to this committee is embraced in the title to the present paper. For the purpose of the investigation, authentic specimens of the barks were received from the chairman of the sub-committee, Dr. Rusby, who had them specially collected for the work.

In order to arrive at a conclusion as to the best method of distinguishing the barks in the state of powder, it was, of course, necessary, first to study them microscopically, and, if possible, find distinctive elements which might survive pulverization, and be recognizable in the state of powder.

The description of the gross characteristics of these barks may contribute little to the purpose of the investigation; but these should be stated, as they have a bearing upon pharmacopœial description, an item of interest to every worker in pharmacopœial revision.

Taking the specimens, furnished as above stated, I should say that the pharmacopœial description of Rhamnus Purshiana is somewhat faulty; the color of the bark on the outside cannot be considered as a "brownish gray," but a dark gray; the thickness, instead of being "about 2 millimeters," is about 1 millimeter. For

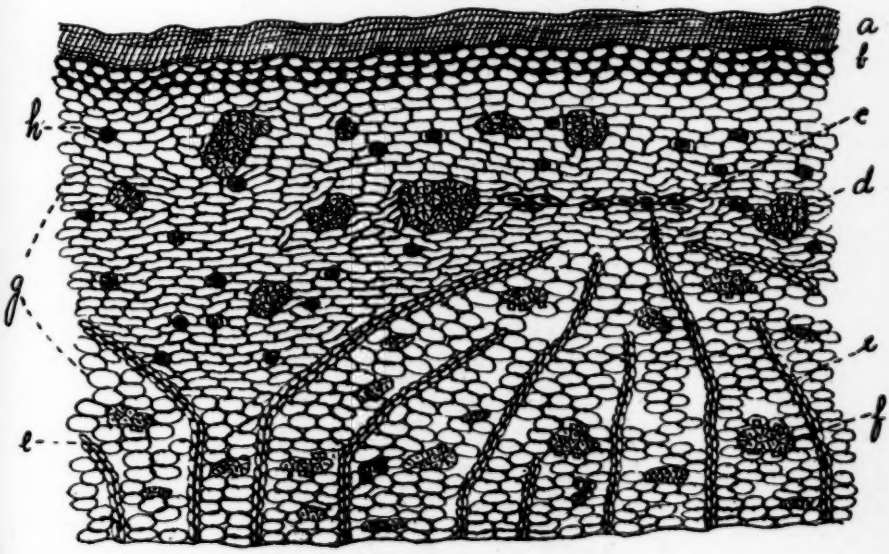

Fig. 1, Rhamnus Purshiana, cross section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *d*, stone cells; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

a description of the external characteristics of the three barks, using the specimens furnished as a guide, I should perhaps adopt in substance the following:

Rhamnus Purshiana.—In quills or curved pieces, about 3 to 10 centimeters long, and about 1 millimeter thick; outer surface dark gray and much encrusted by ashen gray lichen patches, with longitudinal grooves from 3 to 10 millimeters apart; inner surface yellowish to light brownish, becoming darker by age; smooth, glossy and finely striate; fracture short, yellowish; in the inside

layer of thick bark, somewhat fibrous and slightly bitter. When chewed the bark imparts a yellowish color to the saliva.

Rhamnus Californica.—In quills or curved pieces about 3 to 10 centimeters long, and about 1·5 millimeters thick; outer surface grayish brown, beset with numerous lenticels, which are from round to transversely elongated, infrequently longitudinally elongated, and often longitudinally confluent. On scraping the surface of the bark a reddish brown color is observed, which is due to the contents of

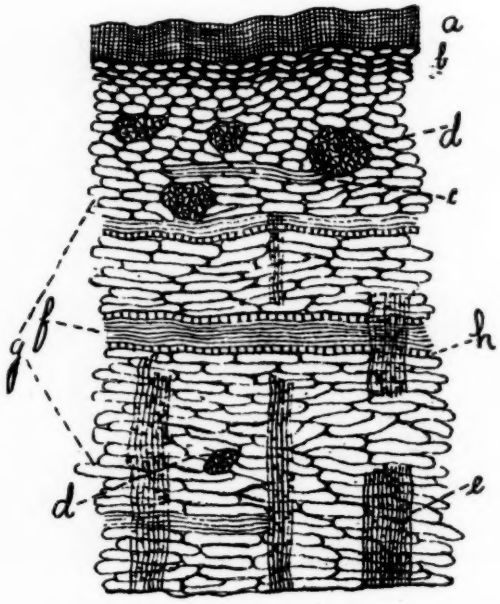

Fig. 2, Rhamnus Purshiana, longitudinal section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *d*, stone cells; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

the cork cells. Inner surface reddish brown to dark brown; smooth, glossy and finely striate; fracture short (inner layer of thick bark, although somewhat fibrous; breaks with a short fracture); inodorous and slightly bitter. When chewed the bark imparts an orange-reddish color to the saliva.

Frangula.—See U.S.P. External character of this bark answers well to official description.

From the marked physical distinction between these barks, one

might suppose it an easy task to distinguish between them in powder; but such is not the case; although differing widely in appearance, they possess very similar microscopical or anatomical structure. The points of similarity may be stated briefly as follows:

(1) Narrow medullary rays, which extend nearly to the cork, these rays in Rhamnus Purshiana *converging at their outer ends.*

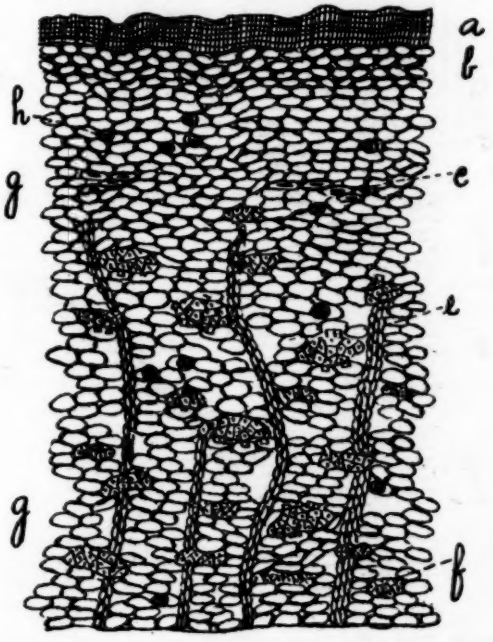

Fig. 3, Rhamnus Frangula, cross section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

(2) Numerous small groups of bast scattered somewhat regularly throughout nearly the whole bark, the number of fibres in the bast bundle varying from 2 to 3 to perhaps 25 in each bundle.

(3) Each bundle of bast is bordered by a layer of thin-walled cells, filled with cubical crystals of calcium oxalate; these crystal cells appearing very distinctly in longitudinal section, and in the powder. (See drawings.)

(4) In each, the relative amount of cork, of collenchyma and of parenchyma is about the same.

These structural similarities would seem to make the distinction between the pulverized barks quite difficult, but fortunately, for this purpose, there are a very few points of dissimilarity revealed by the compound microscope and reagents, which may serve the pharmacologist.

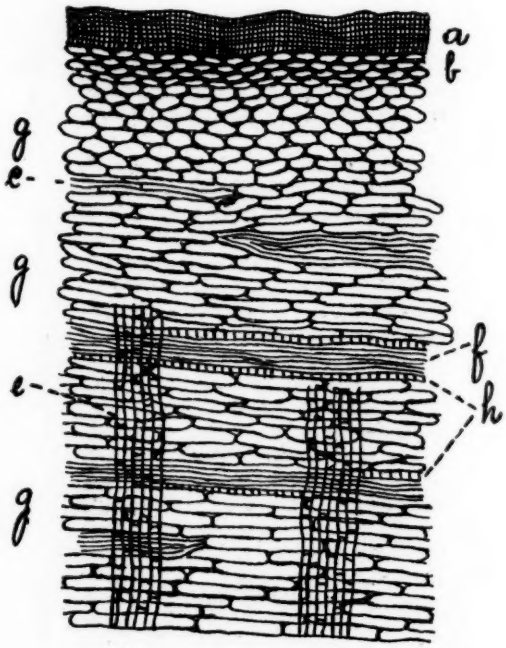

Fig. 4, Rhamnus Frangula, longitudinal section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

Rhamnus Frangula contains no stone cells, while the Rhamnus Californica and the Rhamnus Purshiana contain a large number of them, scattered in large, irregular groups below the cork, and usually outside the region of bast. The presence or absence of stone cells is very easily noted by one familiar with vegetable tissues, and this one characteristic is suggested as a means of distinction between Rhamnus Frangula and the other two barks.

In the case of Rhamnus Purshiana and Rhamnus Californica, it

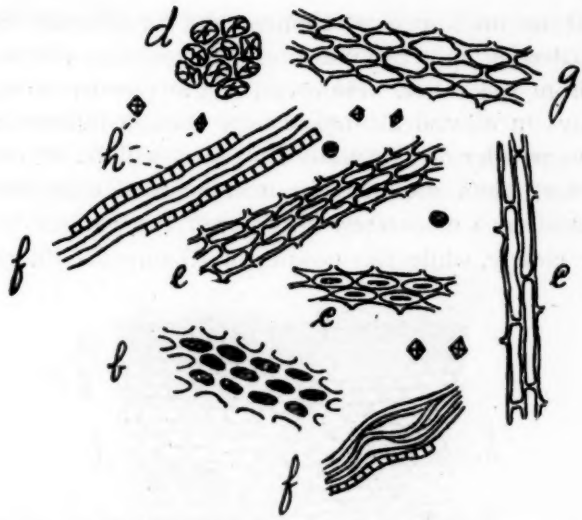

Fig. 5, Rhamnus Californica, powder. *B*, collenchyma; *c*, sclerenchyma (cross); *c'*, sclerenchyma (longitudinal); *d*, stone cells; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

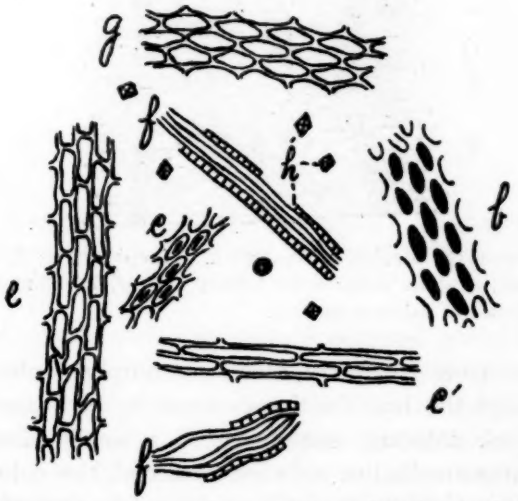

Fig. 6, Rhamnus Frangula, powder. *B*, collenchyma; *c*, sclerenchyma (cross); *c'* sclerenchyma (longitudinal); *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

seems that no microscopical element can be detected sufficiently reliable to depend upon as a means of distinguishing the two species, the one from the other. However, if the powder be macerated several days in diluted alcohol, a very marked difference may be noted; the powder of Rhamnus Purshiana will be of an orange-yellow color, when mounted for microscopical examination, and when viewed by a moderately high power the various tissues will come out clearly, while the powder of Rhamnus Californica, sub-

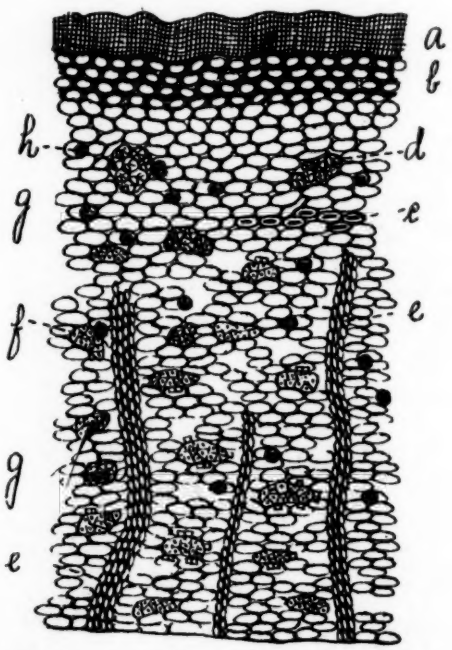

Fig. 7, Rhamnus Californica, cross section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *d*, stone cells; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

jected to the same treatment, assumes a purplish color, and when viewed through the lens the tissues seem to be obscured more or less by a dark coloring matter. If to a small quantity of the powdered barks an alkaline solution be added, the color developed in the Rhamnus Californica is a deep red, while that of the Purshiana is orange. This test may be briefly stated as follows: If 0·2 gramme of the powdered bark be placed in a small test tube, and

there be added 2 c.c. of solution of potassa, T. S., Rhamnus Californica will immediately produce a blood-red color, while Rhamnus Purshiana will produce an orange-red. These differences in *intensity* of color, thus developed, are very marked.

The deep red coloring matter so abundant in Rhamnus Californica is just beneath the outer cork layer, including the phellogen. It can be very plainly seen in the whole bark by the aid of a simple lens.

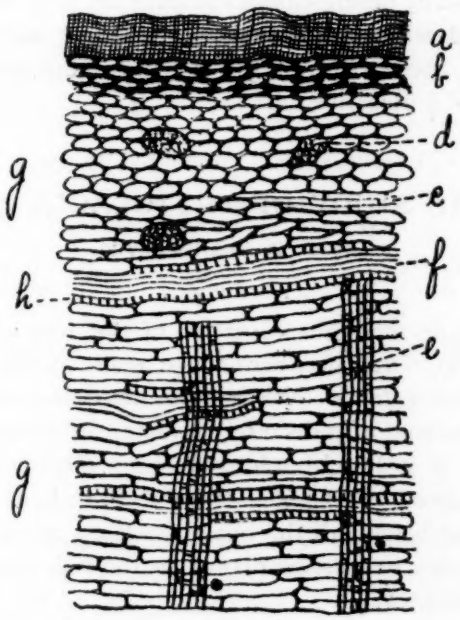

Fig. 8, Rhamnus Californica, longitudinal section. *A*, epidermis; *b*, collenchyma; *c*, sclerenchyma; *d*, stone cells; *e*, medullary ray; *f*, bast bundle; *g*, parenchyma; *h*, crystals of calcium oxalate.

The above outline seems to answer well the purpose of distinguishing between the three barks named; but to detect one powder mixed with another would, perhaps, be very difficult even to one perfectly familiar with the drugs. Rhamnus Californica, when used as an adulterant for Rhamnus Purshiana, could be distinguished by the color test if in considerable quantity; small amounts could hardly be detected.

The following addition to the descriptions of the two official

barks, Frangula and Rhamnus Purshiana is suggested. To the description of Frangula add: Medullary rays not converging at the outer ends (distinction from Rhamnus Purshiana). Stone cells absent (distinction from Rhamnus Purshiana and Rhamnus Californica).

To the description of Rhamnus Purshiana add: Medullary rays in groups converging at their outer ends (distinction from Rhamnus Californica). Stone cells present (distinction from Rhamnus Frangula).

Drawings.—The description accompanying each one of the drawings presented will aid somewhat in pointing out the structural characteristics above referred to. Figures were drawn, using a 1 inch ocular and $\frac{1}{5}$ objective.

A CHEMICAL STUDY OF PHYTOLACCA DECANDRA.[1]

By G. B. Frankforter.

PART FIRST.

The important medical properties of the root of the common poke weed, *Phytolacca decandra*, have made it the subject for a number of investigations. While many important facts have been learned, yet nothing of a definite character in connection with the chemical side of it has been discovered. Crystalline substances have been obtained, but none of them seem to have been carefully studied. It has been with the hope of adding more to the present knowledge of this interesting plant that the following experiments have been conducted.

The root, which has been the principal part of the plant under investigation, was personally obtained, dried and prepared for examination. It has been stated that the root undergoes a change, so that after a year it virtually loses its medicinal properties. The writer has been unable to corroborate this statement. Samples were examined shortly after the roots were gathered, and again after two years. There was no apparent change. The writer therefore believes that if the root is carefully dried immediately after gathering, it will retain its properties for a long time.

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[1] Read before the American Chemical Society, August, 1896, and communicated by the author.

ANALYSIS OF THE ASH.

It seldom occurs that a common plant is characterized by the inorganic substance it contains. In this respect the poke weed seems to be an exception to the rule. Mention has been made of the large per cent. of potassium present, but beyond this the writer has been unable to find any analyses of the inorganic part of the plant. In order to verify the above statement, and to throw more light on the inorganic side of the plant, a complete analysis of the ash was made. The root was carefully cleaned, in order to remove any soil from the surface, carefully dried and analyzed. Three analyses gave the following average:

	Per Cent.
Ash or inorganic matter	13·38

The ash contained the following constituents:

	Per Cent.
Potassium oxide	41·62
Sodium oxide	4·41
Calcium oxide	4·13
Aluminum oxide	1·62
Iron oxide	0·59
Magnesium oxide	6·25
Carbon dioxide	30·01
Chlorine	2·25
Phosphorus pentoxide	3·54
Silicon dioxide	5·21
Total	99·63

It will be observed that the plant is exceptionally rich in potassium. It was at first suspected that this high per cent. of potassium was characteristic of the locality from whence the samples came. Samples from different localities were examined with practically the same results, so that there is little doubt that the plant has the power of assimilating large quantities of potassium. It has been stated that the leaves and stems of the plant contain as high as 4 2 per cent. of potassium hydroxide. This is low as compared with the above analysis, inasmuch as the leaves and stems of plants invariably run higher than the roots in inorganic matter.

ANALYSIS OF THE GASES GIVEN OFF BY A DESTRUCTIVE DISTILLATION OF THE ROOT.

The gas obtained by a destructive distillation of the root of this plant has been briefly referred to as having a peculiar odor and pro-

ducing dizziness if inhaled.[1] With the hope of throwing some light on this physiologically active gas, a complete analysis of it was made. The gas was prepared by placing a known quantity of the dried root in a hard glass retort, removing the air and heating as long as gas was given off. The gas was collected over mercury. It was found to vary widely at different stages of the distillation. That given off early in the process contained as high as 60 per cent. of gas soluble in water, while that near the end of the process contained less than 2 per cent. The gas at various stages of the distillation was tried on several persons without producing any physiological effects. There is a characteristic odor of ammonia and pyridine derivatives throughout the whole process.

Owing to the wide variation in the composition of the gas given off at different stages of the distillation, a series of analyses were made by heating the substance just long enough to drive off sufficient gas for a single analysis. For the experiment, 7·2 grammes of the dried root were taken. The apparatus used was that already mentioned. The distillation was continued until the gas ceased to come off at a bright red heat.

The following is the result of the twelve analyses in the order in which they were made:

ANALYSIS.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Ammonia	65·	60·2	55·	46·	37·	32·	26·	24·2	17·6	15·	6·	2·
Carbon dioxide	13·	13·	14·	19·4	23·	24·6	24·	25·	22·3	13·	12·	10·
Heavy hydrocarbons	0·8	0·8	1·4	2·	2·	2·2	1·7	1·5	1·	1·8	1·	1·
Oxygen	0·4	00·	00·	00·	00·	00·	00·	00·	00·	00·	00·	00·
Carbon monoxide	12·2	18·6	20·1	14·	15·8	14·	12·	6·	10·8	8·8	10·	9·
Hydrogen	00·	·6	1·	2·6	4·	6·	8·6	9·	6·1	6·4	10·	17·8
Methane	0·6	1·8	3·	4·	4·	3·	5·2	8·	9·	10·	16·	19·4
Nitrogen	8·	5·	5·5	12·	14·2	16·2	22·5	26·3	33·2	45·	45·	40·8
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

The gas estimated as ammonia, upon examination, was found to contain other gases, as the amines, but no determinations of the latter have as yet been made. The gas estimated as carbon dioxide

[1] AMERICAN JOURNAL OF PHARMACY, 1888, p. 123.

was largely the peculiar-odored gas which is under examination. It will be seen that the gases increase and decrease quite uniformly. The variations which occur were undoubtedly due to the uneven application of heat.

In order to determine whether or not the nitrogen estimated as such was pure, the hydrocarbons were removed by combustion with pure oxygen, and the residue sparked with excess of oxygen over potassium hydrate until no further change took place. About 200 c.c. of the residue were taken, and at the end of the process there remained 2·6 c.c. of gas, which remained unchanged after several days' sparking gave the spectrum for argon. No satisfactory explanation for this spectrum can as yet be given. The process is being repeated with larger quantities of gas. It seems impossible that this quantity could have come from the air which was left after exhausting the retort with a mercury pump.

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Minneapolis, Minn.

ESTIMATION OF ASH IN VARIOUS DRUGS.

BY CHARLES H. LAWALL.
Sub-Committee of Research of the United States Pharmacopœial Committee of Revision.

The subject of the inorganic constituents of plants has received very little attention in itself; the existing data are scattered, and, in many cases, obtainable only after a laborious search. One extensive work on the ash in plants was published in 1871.[1]

This concerns itself mainly, however, with the per cent. of ash in various agricultural products. The work is in very few libraries in this country, and it was due to the kindness of Professor Trimble that the author was enabled to consult it before tabulating his results upon this subject.

Works on materia medica usually contain a list of the proximate organic constituents of each plant considered; percentages of these constituents are only given in few cases, and then with no reference to the authority whose figures are used. This is often unsatisfactory,

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[1] 1871, *Aschen-analysen von landwirthschaftlichen Producten, Fabrikabfällen und wildwachsenden Pflanzen.* Dr. Emil Wolf.

as in one case which came under the author's notice, the percentage of ash present in a certain drug was stated as "about 8 per cent.;" and, as authentic samples collected by the author gave a maximum of 5·20 per cent., and the highest amount in the commercial drug was 3·42 per cent., the accuracy of the authority quoted is questionable.

Some scattering contributions to this subject have been made in the past few years, but in most cases the data are incomplete in some one respect. It is a matter of surprise to note what little importance has been attached to the moisture in the sample taken for estimation. It is obvious that the moisture content varies with the atmospheric changes to which the drug is exposed, and that the only reliable basis for comparison is the per cent. of ash calculated to, or estimated in, the *moisture-free* substance.

The therapeutic activity of any given drug is attributable to the constituents peculiar to that drug, irrespective of the physiological effects produced by so-called inert cellular tissue. It might, therefore, truthfully be said that: *The therapeutic effect of any given drug is the algebraic sum of the effects of its proximate constituents.* Effect is used in a relative sense only; no uniform or fixed value can be given, in view of the fact that, in no two cases of administration, are the conditions exactly similar. The inorganic constituents may play a very small part in the physiological action of a drug, but, in the present state of our knowledge, no factor, however slight, should be ignored.

Certain groups of plants show marked peculiarities in the amount of ash present. The leaves of those plants belonging to the Natural Order Solanaceæ are noted for the large amount of inorganic matter present; in some instances over 25 per cent., or more than one-fourth their weight, is obtained as ash, upon ignition of a sample.

This work was begun for the purpose of collecting data on a number of the more commonly-used drugs, with the hope that they might be found of service in subsequent studies concerning identification of drugs. The subject proved to be one of great interest, and the results accompanying the present paper are published with the idea that by making occasional contributions of a limited number each time, the tedium of a long, uninteresting list (dry reading at its best) would be avoided, and also that others who are in a po-

Name of Drug.	Part of Plant Used.	Per Cent. of Active Principle or Extract.	Per Cent. of Moisture.	Per Cent. of Ash.	Constituents of Ash.	Per Cent. of Ash.	Per Cent. of Active Principle or Extract.
						(Calculated in Dry Substance.)	
Aconitum	Tuberous root	0·52	9·57	6·07	HCl, H_3PO_4, Fe, Si, Ca, Mg, Al, K, Na,	6·60	0·57
"	"	1·00	7·63	4·28	—	4·63	1·08
"	"	0·76	13·00	4·64	—	5·34	0·87
"	"	0·66	12·58	4·78	—	5·47	0·76
"	"	0·58	12·24	3·73	—	4·25	0·66
"	"	0·54	12·17	3·84	—	4·37	0·61
Aloe Capensis	Inspissated juice	—	—	0·75	—	—	—
"	"	—	—	0·83	—	—	—
"	"	—	—	2·10	—	—	—
Amylum (Zea Mays)	Fecula of seed	—	—	0·169	—	—	—
"	"	—	—	0·453	—	—	—
"	"	—	—	0·450	—	—	—
Belladonnæ Folia	Leaves	0·32	7·41	14·37	HCl, H_3PO_4, Fe, Si, Ca, Mg, Al, K, Na,	15·52	0·35
" "	"	0·41	7·62	13·05	—	14·12	0·44
" "	"	0·48	6·51	12·51	—	13·39	0·51
" "	"	—	8·84	13·31	—	14·60	—
" *Radix*	Root	0·34	7·67	6·55	—	7·09	3·68
Caffea Arabica	Berries	1·10	—	3·23	—	—	—
Calumba	Root	—	8·34	11·71	H_3PO_4, Fe, Al, Si, Ca, Mg, K, Na,	12·66	—
Cannabis Indica	Flowering tops	8·51	9·31	19·98	—	22·03	9·38
" "	"	14·53	5·57	18·09	—	19·15	15·39
Castanea	Leaves	—	7·38	3·92	HCl, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	4·23	—
Chimaphila	"	—	5·71	4·74	HCl, H_3PO_4, Fe, Al, Si, Ca, Mg, K, Na,	5·02	—
Cinchona Calisaya[1]	Bark	8·78 5·12	9·23	2·32	—	2·55	9·66 5·64
" "	"	8·36 4·74	8·30	3·44	H_3PO_4, Fe, Al, Mn, Si, Ca, Mg, K, Na,	3·75	9·11 5·16
" *Rubra*[2]	"	6·25	5·99	15·28	—	16·25	6·64
Coca	Leaves	0·40	—	9·57	—	—	—
"	"	0·76	9·49	10·54	—	11·64	0·83
Colchici Radix	Root	0·30	8·56	2·36	—	2·58	0·32
" *Semen*	Seed	0·27	8·51	4·43	—	4·84	0·27
Crocus	Stigmas	—	10·50	5·29	—	5·91	—
"	"	—	13·62	4·56	—	5·22	—
Digitalis	Leaves	40·03	9·12	10·04	HCl, H_2SO_4, H_3PO_4, Si, Fe, Al, Mn, Ca, Mg, K, Na,	11·04	44·04
"	"	39·63	7·32	10·53	—	11·36	42·78
"	"	41·73	5·22	9·63	—	10·16	44·02
"	"	40·34	9·58	9·76	—	10·78	44·61

[1] Figures for both total Alkaloids and Quinine are given.

[2] Ash per cent. highly abnormal

Name of Drug.	Part of Plant Used.	Per Cent. of Active Principle or Extract.	Per Cent. of Moisture.	Per Cent. of Ash.	Constituents of Ash.	Per Cent. of Ash. (Calculated in Dry Substance.)	Per Cent. of Active Principle or Extract. (Calculated in Dry Substance.)
Eriodictyon	Leaves	—	—	8·07	—	—	—
Extract Glycyrrhiza	Prepared extract	—	—	3·08	—	—	—
" "	"	—	—	3·74	—	—	—
Fagus Ferruginea	Seed	—	6·01	3·27	—	3·48	—
Frangula	Bark	—	—	4·60	—	—	—
"	"	—	10·28	6·82	H_2SO_4, H_3PO_4, Fe, Al, Ca, Mg, K,	7·60	—
Gelsemium	Root	0·56	7·91	3·14	—	3·40	0·61
"	"	0·56	5·15	2·75	H_3PO_4, Fe, Al, Ca, Mg, K, Na,	2·89	0·59
Geranium	Rhizome	—	9·30	7·39	HCl, H_3PO_4, Si, Fe, Al, Mn, Ca, Mg, Na, K,	8·14	—
Glycyrrhiza	Root	—	8·58	4·26	HCl, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	4·66	—
Guaiaci Resina	Resin	—	—	5·30	—	—	—
Guarana	Crushed seeds	4·37	—	1·48	HCl, H_3PO_4, Fe, Al, Ca, Mg, K,	—	—
"	"	4·68	7·06	1·04	—	1·11	5·03
Hamamelis	Bark	—	—	3·80	—	—	—
Humulus	Strobiles	—	8·66	8·51	HCl, H_2SO_4, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	9·31	—
Hydrangea	Root	—	5·87	2·79	HCl, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	2·96	—
Hydrastis	Rhizome	2·80	8·19	8·65	HCl, H_3PO_4, Si, Fe, Al, Ca, Mg, K, Na,	9·42	3·05
Hyoscyamus	Leaves	0·16	6·89	21·86	HCl, H_2SO_4, Si, Fe, Al, Mn, Ca, Mg, K, Na,	23·47	0·17
Ipecacuanha	Root	2·30	9·51	3·89	—	4·29	2·54
"	"	2·15	9·16	3·35	—	3·68	2·36
Jalapa	Tuberous root	15·35	7·91	3·41	HCl, H_2SO_4, H_3PO_4, Fe, Al, Mn, Ca, Mg, K, Na,	3·70	16·66
Kola	Nuts	1·39	—	2·90	HCl, H_3PO_4, H_2SO_4, Fe, Al, Ca, Mg, K,	—	—
"	"	—	10·23	2·32	—	2·58	—
Lobelia	Herb	—	—	5·89	—	—	—
Lycopodium	Spores	—	—	3·60	—	—	—
Nux vomica	Seed	3·10	7·62	2·10	—	2·27	3·35
" "	"	2·35	9·27	1·41	—	1·55	2·58
" "	"	2·58	5·81	1·81	—	1·92	2·73
Pilocarpus	Leaflets	0·10	6·30	10·50	—	11·20	0·11
" [1]	"	0·36	8·75	6·59	—	7·22	0·39
Piscidia Erythrina	Bark	—	7·37	9·72	HCl, H_3PO_4, Fe, Al, Ca, Mg, K,	10·49	—
Podophyllum	Rhizome, rootlets	3·65	7·28	4·41	—	4·75	3·93
"	"	3·95	—	4·48	—	—	—
Prunus Virginiana	Bark	—	7·54	3·49	HCl, H_3PO_4, Fe, Al, Ca, Mg, Na,	3·77	—
Rhamnus Purshiana	"	—	—	5·20	—	—	—
" "	"	—	6·64	7·19	H_3PO_4, Fe, Al, Mn, Ca, Mg, K,	7·70	—
Ruta	Herb	—	8·10	10·82	HCl, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	11·77	—
Sabadilla	Seed	—	8·64	4·71	H_2SO_4, H_3PO_4, Fe, Al, Ca, Mg, K,	5·15	—

[1] Not true Jaborandi; sold as "so-called" Jaborandi.

Name of Drug.	Part of Plant Used.	Per Cent. of Active Principle or Extract.	Per Cent. of Moisture.	Per Cent. of Ash.	Constituents of Ash.	Per Cent. of Ash. (Calculated in Dry Substance.)	Per Cent. of Active Principle or Extract. (Calculated in Dry Substance.)
Sanguinaria	Rhizome	0·68	7·05	3·20	—	3·44	0·73
" [1]	"	1·48	—	5·20	—	—	—
" [2]	"	1·12	—	4·54	—	—	—
"	"	0·47	12·39	2·69	—	3·07	0·54
"	"	—	—	—	—	5·01	1·18
"	"	0·35	8·74	3·42	—	3·74	0·38
"	"	0·76	9·11	3·23	H_2SO_4, H_3PO_4, Fe, Al, Mn, Ca, Mg, K,	3·55	0·83
" [3]	"	1·13	7·39	5·67	—	6·12	1·22
"	"	0·68	8·31	3·17	—	3·45	0·74
"	"	0·68	8·41	2·95	—	3·22	0·74
"	"	1·00	8·40	3·20	—	3·49	1·09
"	"	0·94	8·10	3·19	—	3·47	1·02
Sanguis Draconis	Resin	—	—	2·00	—	—	—
Santalum Rubrum	Wood	—	5·10	10·17	HCl, Fe, Ca, Mg, K, Na,	10·71	—
Sarsaparilla	Root	—	4·36	10·06	—	10·46	—
Senega	"	—	—	3·11	—	—	—
"	"	—	8·80	2·69	—	2·95	—
Sinapis Nigra	Seed	—	—	4·27	—	—	—
" "	"	—	—	5·30	—	—	—
Stramonii Folia	Leaves	0·36	7·53	20·56	—	22·23	0·38
" *Semen*	Seed	0·30	—	2·82	—	—	—
Taraxacum	Root	—	12·11	3·95	HCl, H_3PO_4, Fe, Al, Mn, Si, Ca, Mg, K, Na,	4·49	—
Tragacantha	Gum	—	11·06	2·48	—	2·79	—
"	"	—	11·06	2·27	—	2·55	—
"	"	—	10·66	2·67	—	2·98	—
Trifolium Pratense	Flowering Tops	—	7·57	7·60	HCl, H_2SO_4, H_3PO_4, Fe, Al, Mn, Ca, Mg, K, Na,	8·22	—
Ulmus	Bark	—	—	7·64	—	—	—
"	"	—	9·95	7·60	—	8·44	—
"	"	—	8·28	6·99	—	7·62	—
"	"	—	9·60	8·02	H_2SO_4, HCl, H_3PO_4, Fe, Al, Mn, Ca, Mg, K, Na,	8·87	—
"	"	—	12·35	7·52	—	8·58	—
Veratrum Viride	Rhizome, rootlets	1·90	9·20	10·63	HCl, H_3PO_4, Fe, Al, Si, Ca, Mg, K, Na,	11·70	2·09
Xanthoxylum	Bark	—	7·81	6·32	HCl, H_3PO_4, Fe, Al, Ca, Mg, K, Na,	6·85	—

[1], [2], [3] Specimens collected by the author.

sition to verify or add to the figures here given may be interested enough to contribute additional data.

The general arrangement has been made alphabetical, the official drugs being distinguished by printing them in italics, using the pharmacopœial titles.

The present contribution contains all of the estimations made by the author to date, the lack of uniformity in many respects being due to an imperfect knowledge of what was required when the work was begun.

Those which are incomplete are merely included for comparative effect, and duplications will be made in every case, and, in the future, only those results will be published which are complete as regards the per cent. of ash, per cent. of moisture in the air-dried drug and qualitative examination of ash.

The ash estimations were made in a platinum crucible in the usual manner; the moisture was estimated by drying about 5 grammes to a constant weight at 110° C. In certain cases the alkaloidal or extractive value is included, but this is merely for the purpose of general comparison; the processes used for the estimation of such constituents are at all times obtainable upon application to the author, as a detailed record is kept of all estimations made.

FLORES DATURÆ ALBÆ.

By J. B. Nagelvoort.

The task of investigating the alkaloidal strength of the flowers of Datura Alba, L., was undertaken after reading the article by Mr. Van der Wal, in *Nederlandsch Tijdschrift voor Pharmacie*, 1895, and reproduced in the *Bulletin of Pharmacy*, 1896, p. 153.

It was my intention to go a step further and extend Van der Wal's experiments over the Solanaceæ, then Atropa and Hyoscyamus, on which he reported, and to begin with Datura.

There was not, however, as much material on hand for the work as an English analyst, Mr. Frank Browne[1] had at his disposal.

The flowers of Datura are not used in the United States save for ornamental purposes, while Browne reports that they are considerably used in China as a medicine, as well as for criminal purposes.

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[1] "Datura Alba," by Frank Browne, *Pharm. Jour.*, 1896, p 197.

It will be wise to take particular notice of this, because the Chinese element in our large cities amounts to something. Browne reports that the drug is easily administered in tea.

I might be allowed to remark that the use of Datura as a stupefying agent is practised, on a large scale, by all Asiatics, not by the Chinese exclusively.

Mr. Browne's communication, with its local color, disposes effectually of a doubt expressed in Gehe's *Berichte*, for September, 1896, p. 6. That firm state that they feel bound to call the attention of the public to the irregularity that Naou-yang-hwa is the Chinese name of a flower, which is mixed with aconite tubers, and that this mixture is used, in powder form, in surgery, to alleviate pain. Gehe further states: "Hanbury records that the above name is the Chinese vernacular for *Hyoscyamus*. Naou-yang-hwa and Nau-young-fa (*Datura*) are semi-successful European experiments to reproduce one and the same Chinese hieroglyph." This seems to be a small matter and easily disposed of. Of greater importance is what follows in the same *Berichte*, in regard to *Datura*.

Dr. Pienemann made an analysis of the seeds, of the root, and of the leaves of Datura alba according to Keller's process, so that we have now a fairly accurate knowledge of the value of this drug. Compare also a later investigation by R. A. Cripps in No. 1290, March 16, 1895, of the *Pharm. Journal*.

Dr. Pienemann has, in all probability, exhausted his plants with Prollius' fluid.

Pienemann presumed that the alkaloid he obtained was atropine; he intended to prove this by Vitali's test. He mentioned also the hypothetical "stramonine;" but Vitali's test is a test for mydriatics in general, is a group reagent, not an identity-reaction for atropine only.

Above is said that not as much material could be gathered for this investigation as Browne had at his command. I had about 60 grammes of dry flowers.

Browne found in the dry flowers, Chinese growth, 0·485 per cent. of an alkaloid which he called hyoscine.

I found in flowers grown in parks in Chicago, 0·464 per cent. alkaloid by weight. I presume that Browne's figures are also obtained on the balance, and not by titration and calculation.

Of course, the coincidence of these figures is remarkable. But it

is wise not to attach too much importance to this. I assayed the flowers only once. I do not know if Mr. Browne repeated his analysis. If I had obtained a higher result than Mr. Browne, that would not have been proof that American-grown Datura alba flowers were richer in alkaloid than those collected in China. Neither could the reverse be argued if conditions differed. Let us take it simply as a contribution in favor of the original Van der Wal's investigation, and deduce a recommendation to our U. S. P. Revision Committee from it. When the article, Stramonii folia, is revised for the eighth decennial revision, I would like to see it read "Herba Stramonii, collected in blossom," instead of folia S., so as not to throw away the most valuable part of the plant any longer.

Assay.—The flowers, after being dried without the application of any artificial heat, were reduced to a fine powder. Fifty grammes of this air-dry powder was exhausted by percolation with alcohol of 90 volume per cent. Exhaustion was proved according to analytical rules. Alcohol was recovered *in vacuo*. Residue was taken up with acidulated water (H_2SO_4), whereby all the waxy and resinous matter was left behind. The aqueous fluid, which was carefully kept to a small amount, was, in a separator, thoroughly washed with chloroform, the latter removed. The fluid was made alkaline with ammonia water, agitated again with chloroform. This was collected and the operation repeated to exhaustion. The chloroform was evaporated spontaneously. The residue was dissolved in acidulated water, because the alkaloid was not pure enough, washed with chloroform; the acid fluid being made alkaline again, yielded to chloroform an amorphous, nearly colorless residue, which, being dried over sulphuric acid to constant weight, weighed 0·232 gramme, or 0·464 per cent. This was dissolved in very diluted hydrochloric acid, precipitated with gold chloride, the precipitate dissolved in slightly acidulated (HCl) water and recrystallized from boiling water. The crystals thereby obtained had the form published on page 67 of Flückiger's Reaction, American edition. "Hyoscin goldchloride." Dried over H_2SO_4 *in vacuo*. M.p., 5 determinations, *192° C.*

Atropine goldchloride has a melting point of 137°, Hyoscyamine goldchloride a melting point of 160°.

An extract of the flowers of Datura alba, was free from that large amount of oil that bothers one so much in Sol. Ex. Sem. Stramonii, U.S.P.

Will the Revision Committee take it kindly under consideration to replace stramonium seed with 20 per cent. useless fat, by stramonium flowers with hardly any?

Will a colorless petrolatum preparation of those flowers not make an elegant substitute for the unsightly ointment?

I want to see retained in our U.S.P. the very useful Datura. The flowers are stronger than the seed.

Conclusion.—I have made arrangements to repeat this examination on a larger scale, in the fall of 1897, and will plant a vacant lot next to my laboratory with Datura alba.

Mr. Frank Browne concluded that he obtained hyoscine, goldchloride, m.p., 198°. This will have to be verified also, but material is lacking now. The reader interested herein is referred to the works of E. Schmidt, Max Biechele, Hager, Fisher and Hartwich, and especially to Blythe on "Poisons, their Effects and Detection," London, 1895, p. 376.

SCHOOL OF PHARMACY, NORTHWESTERN UNIVERSITY.

HEAT OF BROMINATION AS A MEANS OF IDENTIFYING FATS AND OILS.

BY WM. BROMWELL, PH.D., AND JOSEPH L. MAYER, PH.G.

A contribution from the Chemical Laboratory of the Brooklyn College of Pharmacy.

Among other work required of the students in the Brooklyn College of Pharmacy in the course in analytical and applied chemistry, is the examination of fats and oils, with a view to identifying them and their adulterants.

In addition to the regular color tests, we had been employing Maumené's method of identifying them by the rise in temperature produced on the addition of sulphuric acid.

This method is a good one in the hands of an expert analyst, but our experience with the students here proved it was not the method for pharmacists; it is somewhat unsatisfactory and the results not always regular and concordant, so much so that Professor Bartley suggested that Professor Bromwell and myself adopt Hehner and Mitchell's method of recognizing them by the rise in temperature produced on the addition of 1 c.c. bromine to 1 gramme of oil, and that the table published by them be extended so as to include as many other fats and oils as could be obtained.

This method, which is quite recent (having been introduced to the chemical world through the *Analyst*, July, 1895), depends for its action on the fact that the oils are natural glycerides containing unsaturated radicals capable of combining with the halogens.

This fact had been taken advantage of by Hübl, whose iodine absorption method is so well known that it needs but to be mentioned. Fawsitt (*Journal Society Chemical Industry*, 1888) tried to utilize the heat evolved by sulphur chloride (S_2Cl_2), but not with sufficient success to make it popular.

To prevent as far as possible loss of heat by radiation, Mitchell and Hehner used Professor Dewar's vacuum jacketed tube, which he had employed in his experiments with liquefied air. It is a small inner tube soldered at the neck to a larger outer tube, from which the air is practically exhausted, leaving almost a perfect vacuum and consequently making it a non-conductor of heat.

The expense of such a tube determined us to make our experiments with a cheaper apparatus, so that our method could be applied and our results obtained at any time or place without special apparatus.

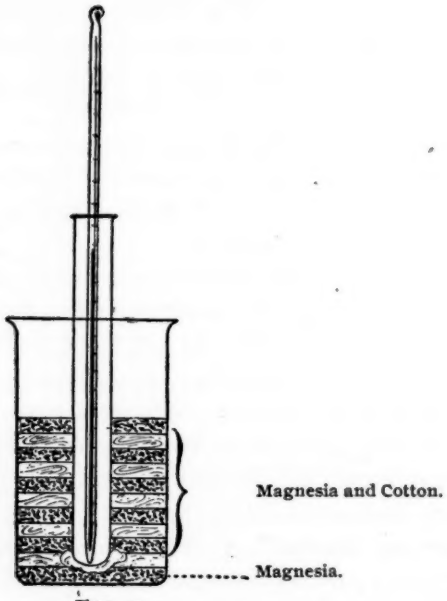

FIG. 1.

The apparatus we adopted consisted of a larger beaker (a graduate or other glass vessel will do when a beaker is not at hand), with about one-fourth of an inch of calcined magnesia in the bottom, a test tube about 7 inches in length, around the bottom of which was wrapped a small piece of cotton; it was then put in the beaker and imbedded in alternate layers of cotton and calcined magnesia, being packed quite tightly so that the tube could be withdrawn and replaced at will without disturbing the nest so made.

A Centigrade thermometer graduated to fifths of a degree completed the apparatus, which, when ready for use, presented the appearance shown in *Fig. 1*.

Mitchell and Hehner added the bromine directly to the oil, but the difficulty of conveniently handling 1 c.c. of it was recognized by Dr. Wiley (*Journal American Chemical Society*, April, 1896), who suggested that it be diluted with chloroform.

Acting upon his suggestion, we diluted in the proportion of 1 c.c. of bromine to 4 c.c. of chloroform.

The action of the bromine on some of the oils being so violent, we diluted or dissolved them in chloroform in the proportion of 6 grammes of oil and made up to 30 c.c. with chloroform. We made up this quantity, so that we might conduct a number of determinations on each oil without having to prepare a fresh solution for each determination.

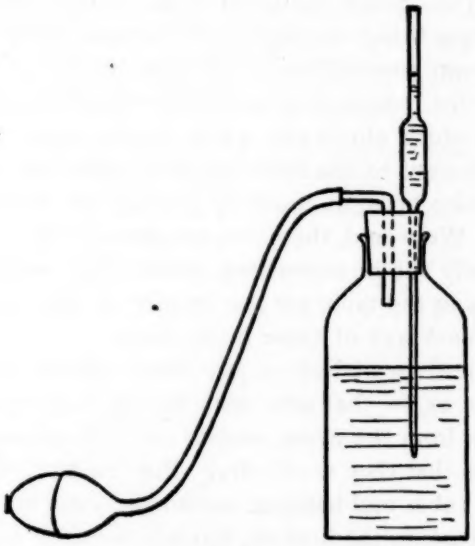

FIG. 2.

Of the chloroform bromine solution, we made up enough to last for one day's work, fearing that the action of the bromine on the chloroform might, in due time, generate hydrobromic acid, which would interfere with the results.

It is of great importance to accurately measure the 5 c.c. of oil solution; this is best accomplished by using a glass-stopped burette, care being taken to avoid any loss by contact with the walls of the tube during the flowing in.

In the oil solution a thermometer is inserted, to see that it has the same temperature as the bromine solution; if such is not the

case, it must be brought to the same temperature. As the action of the bromine on the oil is instantaneous, it is necessary to have the thermometer in the oil solution before adding the bromine.

The bromine being largely in excess of the amount required, the 5 c.c. of the solution need not be so accurately measured; we adopted Dr. Wiley's apparatus for measuring it (*Fig. 2*).

It is simply a wash bottle arrangement; through one opening in the stopper a pipette (graduated on the stem to 5 c.c.) passes nearly to the bottom, through the other a short tube which connects on the outside with an atomizer bulb; by pressiug this bulb the solution is forced up in the pipette to the 5 c.c. mark; the index finger is then used to close the top, the stopper and tube are withdrawn from the bottle, the point of the pipette directed into the oil, and, the finger being withdrawn, the solution flows in.

Our experiments proved that if the solution was allowed to run in very quickly the temperature would be reduced, in some instances, 2°, there being much ebullition, which would throw the hot liquid against the cold sides of the tube and thus reduce the temperature; this result was also brought about by stirring the mixture with the thermometer. We would, therefore, recommend that the bromine solution be slowly run in, consuming about a half minute in adding it. The figures in the table are the results of four determinations on each oil, the average of these being given.

In making the tests we had in use about twelve of the beaker test tube apparatus, so that after making the four tests the tubes were withdrawn from the nests, washed out with petroleum benzine and inverted so that they would dry. For the next set of tests we took four more tubes and beakers, and so on, until we had used all; we then come back to the first set, having them, in the meantime, cleaned, and the temperature of the nest reduced to that of the room.

Experiments made with a beaker with cotton loosely packed, without any magnesia, proved that in this way the temperature was also considerably lowered.

In the table will be found Hehner and Mitchell's figures for the oils on which they worked. There will also be found Dr. Wiley's, who worked on a few oils in the laboratory of the Washington Bureau of the Department of Agriculture.

We are still at work on this subject, and hope in our next paper to give a factor which, when multiplied by the rise in temperature of the oil, will approximately give Hübl's iodine number.

We would also take this opportunity to thank the members of the Class of 1897 for valuable assistance rendered us, under our supervision and direction.

The oils were all supplied gratuitously by the dealers mentioned in the table, and were supplied as the purest obtainable. For their kindness and promptness in complying with our request, our thanks are due.

Name of Oil.	Rise in Temperature.	Average Rise in Temperature.	Dr. Wiley's Figure.	Hehner and Mitchell's Figure.	General Remarks.	From Whom Procured.
Sweet almond	20°0–21°0	20°25	—	17·6°	—	Lehn & Fink.
Butter	9·5–10°0	9·75	—	6·6–7·0°	Sweet, unsalted	T. V. Ketcham.
Cade	24·5–26·5	25·5	—	—	—	Lehn & Fink.
Castor	20·00–22·0	22·0	—	15·0	—	Seeds Preserving Co.
Cocoanut	3·25–3·50	3·31	—	—	—	Colgate & Co.
Cod-liver, A	37·50–40·00	36·6	—	—	—	Martin Manufacturing Co.
" B	33·50–36·50	35·25	—	—	—	Lehn & Fink.
" C	33·5–35·5	34·00	—	—	—	Welles & Welles.
Corn, A	24·75–26·0	25·50	—	21·5	—	Davis Oil Co.
" B	27·5–30·0	28·6	—	—	—	Chicago Sugar Refining Co.
Cotton, A	24·5–25·0	24·75	25·8	19·4	Refined	American Cotton Oil Co.
" B	24·0–25·0	24·68	"	—	Crude	Welles & Welles.
" C	24·0–26·0	25·25	"	—	Refined	"
" D	24·00–25·0	24·32	"	—	"	Lehn & Fink.
Croton	25·00–27·0	26·3	—	—	—	Leo Bernard & Co.
Hoof	16·00–17·0	16·31	—	—	Sold as neatsfoot	Davis Oil Co.
Horse, A	28·00–30·00	29·00	—	—	Brown	Thos. F. White.
" B	21·00–24·0	23·00	—	—	Yellow	"
Lard	18·00–18·50	18·3	—	—	—	Davis Oil Co.
Linseed, A	30·25–32·0	30·99	—	9°–11·8°	Raw	Dianchin Oil Co.
" B	33·00–34·25	33·25	—	30·4–31·3°	Raw, 8 months old	National Linseed Oil Co.
" C	29·5–31·50	30·37	—	"	Raw, new	"
Menhadden	36·50–38·50	37·3	—	—	—	Welles & Welles.
Mustard	22·5–23·25	22·93	—	—	Quite old	
Neatsfoot, A	13·00–14·00	13·68	—	—	Made from hide scrapings	Davis Oil Co.
" B	16·0–17·00	17·35	—	—	—	Welles & Welles.
Oleomargarine	12·00–12·75	12·37	—	—	" Oil "	Schwarzchild & Sulzberger.
Olive, A	20·00–21·00	20·25	—	—	—	Turner.
" B	23·00–24·00	23·2	19·5°	15·9°	50 per cent. cottonseed	—
Palm	13·25–15·00	13·8	—	—	—	Colgate & Co.
Rosin, A	21·50–23·00	22·5	—	—	First run	J. A. Casey.
" B	17·50–19·50	18·5	—	—	Second run	"
" C	20·50–20·50	20·5	—	—	Third run	"
Sesame, A	22·00–24·00	23·0	—	—	About ten years old	L. Arensberg.
" B	22·50–26·50	23·9	—	—	Quite new	"
Skunk	20·25–22·25	21·00	—	—	—	Lehn & Fink.
Sperm	21·50–23·50	22·1	—	—	—	Grennel & Co.
Sunflower	26·50–28·00	27·0	28·4°	—	Old sample	—
Theobroma	8·00– 9·50	8·75	—	—	—	Barker & Co.
Walnut	24·00–26·00	25·00	—	—	—	Lehn & Fink.
Whale	29·50–31·50	30·12	—	—	White	Swan & Finch.

AMMONOL.

By George M. Beringer.

The manufacturers state that "Ammonol is a product of the Amido-benzene series ($C_6H_5NH_2$). It differs essentially from the other medicinal coal-tar products, especially in that it contains ammonia in an active form and has a stimulating action on all the vital functions." Its medicinal action is claimed "to be stimulant, antipyretic and analgesic." The chemical composition is given as "Ammoniated-Phenylacetamide," but the chemical formula given on the label, "$C_6H_5NH_2$," is the accepted formula for *amido-benzene*, which is commonly spoken of as *aniline*.

The writer was induced to make an examination of this *valuable new coal-tar derivative (?)*. It is a powder, having a very faint yellow color, put up in 1-ounce vials. The odor is strongly ammoniacal, and on smelling the vial one can readily detect the peculiar empyreumatic odor of commercial ammonium carbonate. On closer examination, even with the naked eye, one can detect small particles of a crystalline character, indicating imperfect comminution of a crystalline ingredient. This is the so-called *amorphous micro crystals* of the manufacturer's description.

One gramme of the powder was rubbed up with 20 c.c. of water and poured on a tared filter, and the mortar and filter carefully washed with an additional 10 c.c. of water added in small portions. After drying, the residue was a white powder, weighing ·360 gm. A portion left no ash on incinerating. On boiling with concentrated potassa solution it was converted into aniline, and with chloroform readily yielded the isonitrile reaction. From these tests, also supported by solubility and color reactions, I was led to conclude that this was pure phenylacetamide, or acetanilid. According to the U. S. Pharmacopœia, acetanilid is soluble in 194 parts of water, and so the 30 c.c. of water used would have extracted ·154 gm., and this, added to the undissolved portion on the filter, would give the total amount of acetanilid as ·514 gm., or about 50 per cent.

The filtrate was a light canary-yellow-colored solution, and, on testing, showed the presence of sodium and ammonia as carbonates.

The filtered solution of 1 gm. of ammonol in 30 c.c. of water, evaporated on the water-bath, yielded a residue of ·222 gm., and on prolonged heating, minute micaceous crystals separated and sublimed

into loose tufts on the surface. These crystals proved to be acetanilid, showing that, as stated above, it had been partly extracted by the water, and that it was more or less volatile at the temperature of the water-bath. On incineration, the residue left ·158 gm. ash, which required 29· c.c. $\frac{N}{10}$ sulphuric acid for neutralization, which, calculated for sodium bicarbonate, would be ·24317 gm.

One gm. of ammonol was incinerated, and left an ash weighing ·157 gm., which, titrated with $\frac{N}{10}$ sulphuric acid, required 30 c.c., or, calculated as sodium bicarbonate, ·2515 gm. This would indicate the presence of about 25 per cent. of sodium bicarbonate in the product, and leave 25 per cent. for ammonium carbonate.

On adding hydrochloric acid in excess to the canary-colored aqueous solution, the color is changed to a rosy pink, which is again changed to the pale yellow on adding ammonia water. With nitric acid, the color is also changed to pink, but in excess is destroyed, the solution becoming colorless, and ammonia does not again restore the original color. From these reactions I became convinced that a small amount of some aniline color had been added as a disguise, and not for medicinal action. An examination of a number of so-called aniline orange and yellow colors, for one possessing similar reactions and tinctorial properties, was made, and the dye known as *metanil-yellow* was found to give similar reactions. According to Allen (Commercial Organic Analysis, Vol. III, Pt. 1, p. 184), metanil-yellow or orange MN, is the sodium salt of diphenylamine-azobenzene-meta-sulphonic acid.

From my examination, I am compelled to conclude that "ammonol," instead of being a new "coal-tar derivative," is merely an admixture of the well-known acetanilid, sodium bicarbonate and ammonium carbonate, and that the following formula represents its real composition:

	Grammes.
℞ Acetanilid	10·
Sodium bicarbonate	5·
Ammonium carbonate	5·
Metanil-yellow	0·005

Mixtures of acetanilid and sodium bicarbonate, as an antacid and antipyretic and analgesic, have been in daily use by nearly every physician for at least a decade. The addition of ammonium carbonate as an arterial stimulant is not unusual, and in many cases such a mixture must undoubtedly prove serviceable. Mr. Joseph W.

England informs me that at the Philadelphia Hospital they use an ammoniated acetanilid, the formula of which is:

	Grains.
Ammonium carbonate	1
Sodium bicarbonate	1½
Pulv. acetanilid	2½

Misce.

Dose, one to three powders.

Ammonol thus appears to be another of the numerous mixtures of acetanilid that are being palmed off on the gullable physicians as new and valuable discoveries. The names published in their circulars would indicate that the Ammonol Chemical Company have been unusually successful in playing on the credulity of quite a number of prominent practitioners, and medical as well as pharmaceutical journals.

CHEMICAL ANALYSIS OF SAGE BRUSH, ARTEMISIA TRIDENTATA, NUTT.

By Griffith H. Maghee.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 161.

The sage brush, or sage bush, is a small shrub, 5 or 6 feet in height, which grows abundantly on the Western plains, covering hundreds of square miles on the foot-hills of Nevada and Utah, and extending from Arizona to Oregon and Sonora, and as far east as Nebraska. It does not thrive where there is an abundance of water, but rather prefers a dry, barren soil; ranchmen very often clear their ground of it by flooding with water.

When fired, it burns rapidly and with an intense heat, affording excellent fuel, and the Indians employ the smoky flame in curing or smoking their buckskins; they also use an infusion of the leaves for colds, headache and mountain fever (considered by many physicians to be a modification of typhoid fever).

The leaves and flower heads used in the present analysis were collected in Fremont County, Wyoming, at an elevation of 5,000 feet. Fifty grammes of the fine powder were used, and the usual method of plant analysis was employed, except that the drug, after extraction with alcohol, was enclosed in a strong piece of muslin and suspended in the water and succeeding solvents, with the result that a much smaller amount of liquid was necessary for complete

exhaustion, and some loss in handling the drug by the ordinary method was avoided; it also admitted of expression being employed without loss of material.

The following results were obtained:

	Per Cent.
Moisture	8·48
Ash	4·92
Petroleum ether extract, containing volatile oil 0·84, fixed oil and fat 0·41, wax melting at 61° C. 0·61, and caoutchouc 0·26	2·12
Ether extract, consisting of resins	4·25
Absolute alcohol extract, containing resins, glucosidal bitter principle, etc.	3·32
Water extract, composed of mucilage 3·22, glucose 0·52, extractive 4·90	8·63
Alkali extract, containing pectin 2·74, extractive 3·36	6·10
Acid extract	1·14
Lignin	6·44
Cellulose	54·60
	100·00

The ash was composed of calcium, potassium, manganese and iron, combined with hydrochloric, sulphuric, phosphoric and carbonic acids.

The alcohol extract yielded a bitter principle by treating with acidulated water and agitating this solution with ether or chloroform, which removed the principle and deposited it, on evaporation, in an amorphous condition.

Tannin and starch were not found in the drug.

FLUID EXTRACTS.

By William B. Thompson.

Reasonable and well-tempered discussion on subjects in controversy ought to be improving to knowledge. The natural tendency of such would be to turn thought into new channels, or to broaden its scope in directions already pursued. Events which, at times, seem adverse and disappointing, may often be turned into fortuneate advantage. The use and *mis*-use of fluid extracts in extemporizing the preparation of the lesser galenicals, as tinctures, wines, syrups and infusions, has evoked the expression of some opinions and is likely to arouse more. It would seem to be within the con-

fines of truth to say that at least 90 per cent. of the pharmacists of this country resort, in a more or less extent, to the practice of diluting fluid extracts to form the minor preparations. That this practice would inevitably follow the advent of this class of preparations (fluid extracts) having official sanction, as well as unauthoritative origin, was obvious, and plainly foreseen at the various periods of revision, adoption and introduction. And it now has the appearance of an eleventh-hour conversion for pharmacists to criticize the natural sequence of their own acts. No protest having come from the medical profession in regard to any deficient therapeutic value of the lesser galenicals so made, may we not be straining a point or principle somewhat in making too broad a condemnation of the practice?

If the fluid extract is right exactly, and in every particular just what it should be, the addition or dilution (provided it be made without material disturbance of permanent solubility) *must be right.* There are two dilemmas and two horns! If the result of controversy should be to induce pharmacists to discriminate more intelligently between the true and the false—between the good and the bad—much good will undoubtedly arise from a seeming evil. But that the 90 per cent. of pharmacists can be induced by any persuasion or argument to abandon that national penchant for a short-cut to the goal, is an idea too un-American to be entertained. Had we not better wisely adapt the fluids to the dilutions?

PHILADELPHIA, February, 1897.

ZANZIBAR COPAL.[1]

BY A. STEPHAN.

Copal is a collective name for a number of resins that exhibit great differences in their chemical and physical properties; they may, according to the author, be arranged in the following groups:

(*a*) East African, probably derived from Trachylobium mossambicense and Hymenea verrucosa.

(*b*) West African, said to be obtained from Guibourtia copallifera, or from species of Copaifera.

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[1] *Pharmaceutical Journal*, December 19, 1896.

(*c*) Kauri copal from New Zealand, the botanical origin of which is Dammara australis.

(*d*) Manilla copal, obtained from Vateria indica.

(*e*) South American copal, derived from Hymenea coubaril, H. stilbocarpa, Trachylobium martianum, T. hornemannianum.

The first three are fossil resins, and are dug up out of the earth, whilst the last two are collected from the plants yielding them.

To the East African copals belong the following three varieties:

(1) Copal from Mozambique.

(2) Copal from Madagascar.

(3) Copal from Zanzibar.

The purity and hardness of the last variety render it the most valuable, and the principal object of the author's work was to investigate the constituents of Zanzibar copal; the details that follow relate, therefore, to that variety only. This must be emphasized, because many statements are met with without any mention of the variety of copal to which they refer.

From Bagamoyo, in East Africa, the author received raw (unwashed) copal, pure copal, and specimens of the tree yielding it. The resin is brought down by the natives to Kiboa from districts from the coast; the botanical specimens came from Usegna, which lies inland westward from Bagamoyo. The commercial resin, obtained from a German firm, agreed in its characters with the genuine specimens sent from East Africa.

Zanzibar copal, finely powdered, melts at about 140° C.; it is slowly but completely soluble in alcohol; benzol, chloroform and glacial acetic acid dissolve about 30 per cent., ether about 34 per cent., petroleum spirit and carbon bisulphide about 10 per cent.

When boiled with alcohol the resin caked, and only a slight proportion dissolved, but by repeated digestion with alcohol it could be brought entirely into solution and precipitated with water. The resin thus purified was more soluble in the menstrua previously mentioned, and dissolved also in boiling very dilute solution of potash (0·1). All attempts to separate it into other constituents were unsuccessful, nor could it be saponified. It appeared to consist of resin-acids, the principal of which, constituting about 80 per cent. of the resin, was called trachylolic acid. This acid could be obtained with difficulty in minute sphæro-crystalline masses, melting at 168° C. From it the potassium, copper and iron salts were pre-

pared. A second acid, present to the extent of about 4 per cent. only, was also obtained; to this the name isotrachylolic acid was assigned. These two acids, together with about 6 per cent. of α-copal resin and β-copal resin, a bitter principle and volatile oil, form the constituents of Zanzibar copal as far as the author could succeed in separating them.

An examination of the stems sent from Usegna showed that, although the primary cortex contains schizogenous secretion ducts, these are soon thrown off as the secondary cortex is produced, and in the bark of older twigs and of the stem no ducts could be found. The resin appears, therefore, to the author to be a pathological product.

RECENT LITERATURE RELATING TO PHARMACY.

ASSAY OF JOHORE GAMBIER.

W. O. Richtmann (*Pharmaceutical Review*, **15**, 27) has examined six specimens of Johore gambier obtained by the University of Wisconsin from the Columbian Exposition. The tannin was estimated by the process recommended by the Commission of German Technical Chemists and published in 1885; the catechin was determined by extracting it from the aqueous solution of the gambier, and the ash and moisture according to the usual methods. The following are the results in per cent.:

Specimen No.	Moisture.	Ash.	Tannin.	Catechin.
2,900	12·37	4·35	39·63	11·16
2,901	11·20	3·63	32·51	9·22
2,902	1·38	3·65	40·51	9·39
2,904	1·50	1·87	46·95	5·25
2,905	8·37	3·77	22·21	8·68
2,906	7·00	4·13	29·94	6·98

The presence of two fungi, Penicillium glaucum and Aspergillus niger, was demonstrated.

ON THE SEPARATION OF NITRATE OF COPPER FROM NITRATE OF SILVER IN THE MANUFACTURE OF CAUSTIC.

C. J. H. Warden (*Pharmaceutical Journal*, January 23, 1897) gives the following method for separating these two salts: It is not generally known that strong nitric acid precipitates nitrate of silver from concentrated aqueous solutions, and this action has been used

in the manufacture of caustic at the Calcutta Medical Depot. The silver employed always contains a certain amount of copper, and after solution of the metal in nitric acid and separation of the gold, as much as possible of the nitrate of silver is crystallized out, and the deep blue mother liquor evaporated to dryness. The dry salt is then powdered and placed in a glass funnel, stopped with a plug of asbestos, and percolated with strong nitric acid, specific gravity 1·42. The nitric acid dissolves the whole of the nitrate of copper, leaving the nitrate of silver perfectly white, while only a very small amount of the latter salt is dissolved. The nitric acid can, of course, be recovered by distillation, and the small amount of nitrate of silver separated from the nitrate of copper by precipitation with salt, and, when sufficient has accumulated, reduced to the metallic condition by one of the usual methods. In preparing nitrate of silver by crystallizing out the salt, a point is reached when the mother liquor is too highly charged with nitrate of copper to permit of a sufficiently pure silver salt separating by crystallization, and this impure or "blue nitrate of silver" has hitherto been returned to the mint.

By the adoption, however, of the method above described, these residues can be worked up and nearly the whole of the silver obtained in the form of nitrate, and as the nitric acid can be recovered the process is decidedly economical, while it affords a salt practically free from copper.

TONKA BEANS.

The following information concerning this drug is furnished by Superintendent J. H. Hart, of the Royal Botanic Gardens, Trinidad, in the *Bulletin of Miscellaneous Information* for January, 1897, p. 11.

The tonga, tonquin or tonka bean is the product of a tree known to botanists as Dipterix odorata, Willd., and less frequently as the Coumarouna odora of Aublet. The latter, however, is given in the Kew Index as the *nomen prius*.

The tree thrives well in Trinidad when planted in shady, damp situations, and is very abundant in the forest of the neighboring mainland of Venezuela. The fruit or seed ripens in June and July, and in these months large shipments are received in Trinidad from South American ports. In the newspaper of July 10, 1896, the arrival is reported of a consignment of 260 bags "Tonca Beans,"

by S. S. Bolivar, an Orinoco trader. The beans are sent to Trinidad for preparation for European and American markets; for this purpose they are conveyed to warehouses, where, under customs regulations, they are steeped in rum for a certain time, and are then spread on the floors in layers 9 to 12 inches in thickness, to undergo a kind of fermenting and decaying process, during which white crystals are developed on the outside of the bean. As much as £30,000 worth have been imported and reshipped during a single year. The tree grows some 60 or more feet high. It belongs to the Leguminosæ or bean family, but is one of the few members of this order that produces a single-seeded drupe-like pod, which does not open at maturity. The seed, when ripe, so soon loses its vitality that it is difficult at times to procure supplies for raising plants.

A SOLVENT CAPABLE OF SEPARATING CODEINE FROM MORPHINE.

L. Fouquet (*Jour. de Pharm. et de Chim.*, [6], 5, 49) has found that morphine is insoluble in anisol in the cold, and only slightly soluble at the boiling temperature. Codeine, on the contrary, is soluble in the same solvent cold, and its solubility rapidly rises with the temperature according to the following:

Temperature.	Morphine.	Codeine.
9°	Insoluble.	7·80 per 100, by weight.
16°	"	15·28 " "
32°	"	
100°	0·95 per 100.	164·00 " "
150°	4·80 "	

These investigations were made with a very pure anisol, boiling at 150° C., and having a specific gravity of 0·991.

Morphine was found to crystallize in beautiful, colorless, anhydrous prisms by chilling the solution made in boiling anisol; these crystals did not melt at 120°, like the hydrated morphine, but became brown at 210°, and were converted into an oily black liquid at 247°.

It should be noted that the solubility of the codeine is increased by crystallization from anisol; since after one crystallization the alkaloid dissolves in the proportion of 10·75 parts per 100 at the temperature of 0°, whereas the proportion is only 7·80 per 100 at 9° with the codeine of commerce.

The author concluded that he could, with anisol, effect a separa-

tion of the two alkaloids when mixed, and to establish this he made a mixture of 1·044 grammes codeine and 0·710 grammes of morphine; he exhausted this with 20 c.c. of anisol at 15°, and washed the residue with 10 c.c. more of the solvent poured on the filter; after drying he found the residual morphine to weigh 0·702 grammes, corresponding to a loss of a little over 1 per cent. From these results he concluded that anisol is applicable in many ways as a laboratory solvent in toxicological investigations.

NATIVE FOOD PLANTS OF THE COEUR D'ALENE INDIANS.

The following is taken from a "Report on a Botanical Survey of the Coeur d'Alene Mountains in Idaho," by John B. Leiberg. *Contributions from the "U. S. National Herbarium"* Vol. 5, No. 1.

The native food plants are few. The paucity of plants suitable for human food is one of the most remarkable circumstances in a region which supports such vast quantities of vegetation as does this in its forest covering. Probably, for this reason mainly, it contained only a small aboriginal population, and the only localities in which there appear to have been permanent settlements of the Indians were in the slack-water portion of the Coeur d'Alene—possibly some existed in the lower valley of the St. Joseph. The rest of the country was visited by them only in their migratory summer and fall excursions in pursuit of game and fish, with which the St. Mary and St. Joseph Valleys formerly abounded.

The most valuable food plant in the dietary of the Coeur d'Alene Indians was undoubtedly the camass (Camassia esculenta), a plant belonging to the lily family, therefore related to the onion, but lacking all trace of alliaceous flavor and smell. The esculent part of the plant is the bulb, which, in the fresh state, is of an oblong shape, seldom more than 2·5 cm. (1 inch) in diameter and 4 cm. (1¾ inches) long. It is mucilaginous, and possesses very little, if any, flavor. The flowers are bright or deep blue, and a camass meadow in full bloom, seen from an elevation, gives the impression that one is looking at a body of very clear water reflecting a cloudless sky. The lower portion of the valley of the St. Joseph, and, in particular, that of the St. Mary and its tributaries, were, before the advent of settlements, among the classic camass grounds of the Coeur d'Alenes. Here the tribe came in large numbers each sum-

mer to dig the root and to hunt the deer and elk, which roamed by the thousand in the surrounding forest, and to catch the trout with which the streams teemed. Every meadow was a camass field. The plant was so plentiful in many places that it is no exaggeration to say that in the upper St. Mary basin more than one-half of the total herbaceous vegetation in the lowlands was composed of this one species. With the advance of settlements came the utilization of the camass fields as hay meadows. This ended the existence of the plant, except as a weed in the farmers' fields, and the camass digging in the Coeur d'Alene basins, like the game, is now a thing of the past. Strangely enough, the plant seems to have been entirely absent from the North Fork areas, at least I do not know of a single locality where it occurs.

Two species of lichens, Alectoria fremontii and Alectoria ochroleuca, principally the form sarmentosa of the latter species, were eaten by the Coeur d'Alene tribe. Both are extremely plentiful at all elevations. Boiled, or rather baked, in which latter condition they were mainly used, together with venison, they become somewhat gelatinous in their consistency, and lose the bitter taste which they possess in a fresh state.

Of fruits, they had huckleberries (Vaccinium myrtilloides principally), raspberries (Rubus leucodermis and R. strigosus), blackberries (Rubus ursinus or vitifolius) and service berries (Amelanchier alnifolia). These fruits are gathered and used at the present time by the white settlers, but none are abundant in the region except the huckleberries and service berries, and these not every year. The Coeur d'Alene Indians draw no more native plant foods from these mountains. They are now mostly farmers, have large and fairly well-cultivated ranches, and find in the raising of the cereals and vegetables of civilization a far more bountiful supply of food, and much more palatable withal, than they ever obtained from the laboriously gathered camass of their mountain meadows.

Professor Dr. R. Kobert has left Dorpat, Russia, and will, in future, be located at the *Brehmenschen Lungenheilanstalt* in Görbersdorf, Germany, where he will occupy the position of director. Dr. Kobert's ten years as Professor of Pharmacology at the University of Dorpat have been eminently successful ones, and many expressions of regret have been heard from those with whom he was associated.

Dr. Hans Hermann Julius Hager recently died at Neuruppin, Germany, at the advanced age of eighty-nine years. We hope to furnish a suitable sketch of this eminent pharmacist in our next issue, written by one of his friends.

EDITORIAL.

EIGHTH INTERNATIONAL PHARMACEUTICAL CONGRESS.

The General Pharmaceutical Association, of Belgium, has decided to hold the Eighth International Congress of Pharmacy in Brussels, August 14 to 19, 1897.

There will be six sections organized :

(1) Legislation and questions of professional interest, Deontology and Pharmaceutical Education.

(2) Practical Pharmacy, Pharmaceutical Chemistry and Pharmacopœia.

(3) Food.

(4) Sanitary Matters, Public Health.

(5) Microscopical, Bacteriological and Biological Researches.

(6) Toxicology.

The following questions have been suggested by the Committee of Organization to be discussed at the meetings :

(1) In the actual state of science, is it not advisable to enforce in all drugs and medicines a normal quantity of active principles ?

(2) Is it not necessary to unify the modes of analysis of medicine and of their active principles ? If so, what are the best ways of doing so ?

(3) As a question of public safety, what are the best regulations of the practice of pharmacy ?

(4) From a bacteriological point of view, what is the best system of analysis of drinking water ? How far can the methods actually known, be relied upon ?

(5) Has the chemist the right of preparing and selling organic essences and the substances employed in organotherapy ? Which are the best ways of insuring the chemist of the value of these substances, and also of serums ?

(6) Show the best ways of encouraging the manufacture of new medicines ? Is it possible, in patents, to amalgamate the protection of private trade and public good ? Would it not be preferable for the chemist to sell them and the doctor to prescribe them under names more appropriate to their composition ?

(7) Prepare the plan of a programme of pharmaceutical studies.

In addition to these queries, the committee has offered a list of twenty subjects for papers, on which some six prizes will be awarded. Those who desire to take part in the Congress should send their names to M. Maurice Duyk, secretary, or Dr. Fernand Ranwez, president, 102 Chaussée de Wavre, Brussels, Belgium.

AMERICAN MILK SUGAR.

Previous to the year 1890, milk sugar from Switzerland was largely used in the United States. The establishment of a large number of "creameries," however, has changed this condition of affairs materially. After making butter and cheese, milk sugar is the only by-product. The vacuum pan appears to have made this substance available to such an extent that it not only largely supplies the demand at home, but it has become a factor in foreign markets. The milk sugar manufacturers of Germany have petitioned their Government for a protective tariff, not against the Swiss product, but against that from America, which, the petitioners claim, will gain such a foothold that it will be difficult to exclude it. Consul Germain, at Zürich, says that the export of Swiss milk sugar to America has almost ceased.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PRINCIPLES AND PRACTICE OF AGRICULTURAL ANALYSIS. By Harvey W. Wiley, chemist of the U. S. Department of Agriculture. Volume III, Agricultural Products. Chemical Publishing Company, Easton, Pa. 1897.

The third and final volume of this valuable work has recently been completed, and occupies 665 octavo pages. The three volumes cover about 1600 pages. Volume I deals with soils and their analysis; Volume II treats of fertilizers, and Volume III of agricultural products. All are full of special information for the analyst, but the third volume appeals especially to the pharmacist. It first considers the operations of sampling, drying, incinerating and extracting, and then takes up the special processes involved in estimating sugars and starches, carbohydrates in crude or manufactured agricultural products, fats and oils, nitrogenous bodies, dairy products and miscellaneous agricultural products. The citation of authorities throughout the work has been on a liberal scale, so that one has at his command a complete view of the whole subject. There is no other book like it in the English language, and its possession is almost a necessity to every one having to do with the analysis of organic substances.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Forty-fourth Annual Meeting, held at Montreal, Canada, August, 1896, also the constitution, by-laws and roll of members. Published by the American Pharmaceutical Association. Baltimore. 1896.

It is with considerable satisfaction that we note the publication of the Proceedings some three months earlier than they appeared last year. It is to be hoped that ere long they may appear within three months of the adjournment of the meeting.

The something over 500 pages of Report on the Progress of Pharmacy are a part of this volume, which will be of lasting value. Professor Diehl has made an excellent collection of abstracts, which are both readable and instructive.

The original papers are an improvement over those which have appeared in some previous volumes, although, as many of them were not thought sufficiently well of by the members at the meeting to admit of their being more than read by title, it is a question whether they should not have been curtailed somewhat or omitted altogether.

A SIMPLE METHOD OF WATER ANALYSIS, especially designed for the use of medical officers of health. By John C. Thresh, M.D. (Vic.), D.Sc. (Lond.), D.P.H. (Camb.). J. & A. Churchill, London. 1897.

What we took for a valuable work on water analysis for health officers and physicians came to an untimely end in our estimation before we passed the introduction. The claims for recognition by this book appear to be based on the use by the author of a prepared reagent, called a "soloid," whereby he is able to give the free ammonia, chlorine, nitrites, nitrates, hardness, absorbed oxygen, etc., in water, with a facility that is little short of magical. It is a kind of tablet medication applied to chemistry.

The author apologizes for this mechanical method of conducting water examinations on the score of necessity, but it strikes us that the water had

better be let alone rather than to be tested with reagents of which the so-called analyst can know nothing. A medical officer, with a case of ready-made reagents and this book, would be a dangerous man. We believe there is no better way to explain the character of the book than to quote the following test for nitrites :

"Take about 70 c.c. of the water in one of the tubes, dissolve therein 1 soloid of compound potassium iodide, add a soloid of acid sulphate and dissolve. Note whether any blue color develops within five minutes, and record whether faint, distinct, very distinct or dark blue. If no blue color develops in five minutes, nitrites are absent. The blue color, if produced, will be proportionate to the amount of nitrites present."

HANDBOOK OF STRUCTURAL FORMULÆ, for use of students. By Henry Leffmann. P. Blakiston, Son & Co. Philadelphia. 1897.

Almost every one having to do with chemistry has felt the need of a book with the foregoing title. Dr. Leffmann has, in compiling such a work, done a real service to students, and, we might add, especially to those who are interested in the relation between chemical composition and physiological action. Only alternate pages have been printed, in order to admit of the addition of new compounds and of notes. A table of elements and an index add to the completeness of the work.

PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING OF THE NORTH CAROLINA PHARMACEUTICAL ASSOCIATION, held at Moorehead City, July 22 and 23, 1896. Raleigh, North Carolina. 1896.

The two original papers are : "Guaiacol," by E. V. Howell, and "Expenses in Comparison with Purchases of Drugs, and Expenses in Comparison with Sales of Soda Water for a Period of Ten Years," by H. R. Horne.

DES ACANTHACÉES MÉDICINALES. By Georges Dethan. Thèse ; École Supérieure de Pharmacie de Paris. 1896–97.

This is a complete illustrated monograph on the medicinal members of the natural order Acanthaceæ. The work is divided into two parts. In the first part, the author treats the members of the order in general, giving the geographical distribution, history, general morphological and anatomical characters, principles of classification, properties and uses. In the second part, the individual plants receive special treatment in regard to their morphology, anatomic structure, properties and uses. The whole comprises 192 pages of valuable reading matter, with a complete index.

ON THE TOXIC ACTION OF DISSOLVED SALTS AND THEIR ELECTROLYTIC DISSOCIATION. By Louis Kahlenberg and Rodney H. True. Reprint from *Botanical Gazette*, August, 1896.

NATIVE DRUGS OF CEYLON. By Professor Rodney H. True. Reprint from *Pharmaceutical Review*, January, 1897. Bassia longifolia constitutes the special subject of this interesting communication.

GENERAL REPORT ON A BOTANICAL SURVEY OF THE COEUR D'ALENE MOUNTAINS IN IDAHO DURING THE SUMMER OF 1895. By John B. Leiberg.

Contributions from the U. S. National Herbarium, Vol. 5, No. 1. Issued January 25, 1897. A number of interesting subjects are discussed concerning the Coeur d'Alene region, notably, the mineral deposits, native food plants and forest resources. Some of these we shall take occasion to notice elsewhere in this JOURNAL.

ELECTRO-GERMINATION. Bulletin No. 43. Hatch Experiment Station of the Massachusetts Agricultural College, January, 1897.

This interesting contribution shows that electricity exerts an appreciable influence upon the germination of seeds. As a result of experiment it has been found that at the end of twenty-four hours, over 30 per cent. more seeds were germinated in the treated lots than in the normal, at the end of forty-eight hours about twenty per cent., and in seventy-two hours six per cent.

CALENDAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. Besides giving information to members and others concerning the Society, this book contains many other valuable matters of interest to the pharmacist in general.

LES DROGUES RECEMMENT INSCRITES AU CODEX. Par le Dr. Louis Planchon. I. Les Strophanthus. II. Le Cascara Sagrada. Reprints from *Bulletin de Pharmacie du Sud-Est.* 1896. These are illustrated contributions on the two drugs, from a French standpoint, and are a valuable addition to the subject.

THE JOURNAL OF PHARMACOLOGY is the title of the successor to the *Alumni Journal* of the New York College of Pharmacy. The first number makes a good start with a contribution on "The Comparative Anatomy of the Roots of Rio Ipecac (Uragoga Ipecacuanha, Baill) and Carthagena Ipecac (Uragoga Granatensis, Baill)." By Albert Schneider, M.S., M D.

PRACTICAL DRUGGIST AND PHARMACEUTICAL REVIEW OF REVIEWS is the title of a new pharmaceutical journal; it is conducted by Benjamin Lillard, 108 Fulton Street, New York.

THE PHYSICIAN'S VEST-POCKET FORMULA BOOK. Fourteenth Edition. Published by McKesson and Robbins. New York. 1897.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 17, 1897.

The fifth of the present series of Pharmaceutical Meetings was held in the Museum of the College at 3.30 P.M. Mr. J. W. England presided. The minutes of the last meeting were allowed to stand as published.

The presentation of specimens was next in order, and the registrar called attention to the following, which were sent by Mr. E. M. Holmes, Curator of the Pharmaceutical Society of Great Britain: False Buchu, False Maranham Jaborandi, Drimys Granatensis (pepper bark), Adulterated Hellebore, Aracati Jaborandi, Ceylon Nux Vomica, Pilocarpus Microphyllus and Chinese Colocynth. On motion, it was ordered that an expression of thanks be sent Mr. Holmes for his donation.

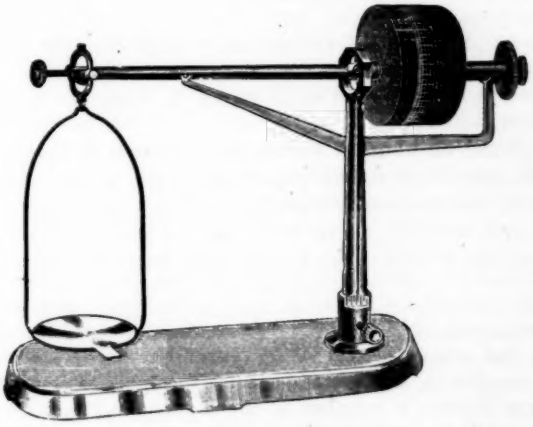
Prof. Remington reported the results of a large number of experiments in a paper entitled "Acetic Acid as a Menstruum and Solvent" (see p. 121). The

paper was accompanied by samples of liquid preparations of various drugs, and in calling attention to these, Prof. Remington said that acetic acid as a menstruum was unsuited for some drugs, but that it could be used to replace alcohol in a number of instances.

He also remarked upon the question of the cost of these solvents, and stated that an extract made with alcohol was six times as expensive as one made with acetic acid.

The subject proved to be of special interest to the retail pharmacists present, and several of them reported favorably upon its use in making preparations of such drugs as sanguinaria, ergot and gentian.

In connection with this subject, Professor Remington showed a convenient device for controlling the flow of percolates, which he recommended as much superior to the rubber tubing directed by the Pharmacopœia. The principle embodied was that of a valve regulated by a screw adjustment.



The Micrometer Balance.

A paper on "Ammonol" was presented by Mr. Geo. M. Beringer (see p. 150). Samples of ammonol from an original package and ammonol made according to a formula, which the author proposed for the compound after examination of the manufacturer's product, were exhibited, and attention directed to the complete similarity in appearance of the two products. The paper elicited considerable discussion, during which the frequency with which physicians directed ammoniated acetanilid was remarked upon.

"A Chemical Analysis of Sage Brush, Artemisia Tridentata, Nutt." was the subject of a contribution, by Mr. Griffith H. Maghee (see p. 152). The flowers and leaves were the parts examined, and in addition to the usual plant constituents, a bitter glucosidal principle was obtained, which was found difficult to separate.

The last paper on the programme was presented by Mr. Chas. H. LaWall, and was entitled, "Estimation of Ash in Various Drugs" (see p. 127). This was the first of a series of papers on this subject which the author intends to

present. Results of examinations of more than 100 samples, official and unofficial, were tabulated. If completeness in the analysis of plants is at all desirable, then the importance of such work is at once apparent, and to the future collaborators of materia medica such knowledge will prove extremely valuable.

Professor Remington called attention to a new form of prescription balance, which is manufactured by the Micrometer Balance Scale Company, of Troy, N. Y., and is illustrated by the accompanying engraving. The arms are of unequal length and there is but one pan. The knife edges are delicately adjusted and the ordinary weights are discarded. The principal feature of the device is embodied in two graduated cylinders, in combination with a screw. The inner cylinder is rigidly attached to the arm, and by moving the outer cylinder either to or from the fulcrum, weighing is accomplished, the weight being read on the index.

There being no further business, a motion to adjourn was affirmed.

T. S. WIEGAND,
Registrar.

OBITUARY.

Auguste Trécul, the eminent French plant anatomist, died in Paris, October 16, 1896. His most noteworthy papers pertained to the vascular system of plants. Under the auspices of the French Government he explored various regions of North America in 1848 and 1849, and many of the cactus species of European gardens, as well as the Yucca, which bears his name, were introduced by him.

On August 9, 1896, *John C. Allen* died at his home, 335 South Fifth Street, this city, in the ninetieth year of his age. He was educated as a druggist, having graduated with honor from the Philadelphia College of Pharmacy in 1829. He was elected a member of the College in 1829, and for many years was noted as being the oldest living alumnus. He was a direct descendant of Nathaniel Allen, one of the commissioners of Penn, for laying out Philadelphia.

Henry Bower, a well-known business man of this city, died at his late residence, 130 South Twenty-third Street, March 26, 1896, aged sixty-three years. He graduated from the Philadelphia College of Pharmacy in 1854, and after graduation, entered business as a chemical broker. Subsequently, he engaged in the manufacture of chemicals. Glycerin was one of the products made, and several years ago he received the Elliott-Cresson Medal from the Franklin Institute for the process for the utilization of crude glycerin. He was considered an authority on subjects relating to the manufacture of chemicals, and was the author of a number of articles on these subjects. He was one of the Board of Managers of the Franklin Institute and a member of the American Pharmaceutical Association.

Henry Trimen, M.B., F.R.S., F.L.S., died at Peradeniya, Ceylon, October 16th, in his fifty-third year. He was appointed Director of the Botanical Gar-

den, Ceylon, in 1879, and held that position until July last, when he retired, on account of serious ill health. Dr. Trimen's administration was signalized by great success, for not only did the gardens at Peradeniya take front rank among the great botanical establishments of the world, but three volumes of the "Hand-book of the Flora of Ceylon" were completed, and the fourth and last volume was in course of preparation. The work entitled, "Medicinal Plants," he prepared in conjunction with Professor Bentley, while he was an assistant in the botanical department of the British Museum. He was also one of the authors of Trimen and Dyer's "Flora of Middlesex," and for a number of years editor of the *Journal of Botany*.

Alfred Henry Mason, Ph.C., F.C.S., F.R.M.S., died at his home in New York City, November 2, 1896. His illness was only of short duration, and by his death pharmacy lost one of its most active and efficient representatives. Mr. Mason was identified with a large number of societies and scientific bodies, and had served in many of these in an official capacity, and was equally well known in professional and trade circles, not only in this country, but abroad as well. He was born at Newcastle-Under-Lyme, England, fifty-three years ago, and at an early age began his pharmaceutical career. In 1866, he became identified with the wholesale trade, and had been actively interested in this branch of business ever since. In 1892, he began his residence in New York, when he was appointed secretary of the firm of Seabury & Johnson, of that city. About a year ago he was elected secretary of the College of Pharmacy, and for five months previous to his death had been editor of the *Alumni Journal*.

George Frederick Schacht, a pharmaceutical chemist of Clifton, Bristol, England, died at his home, December 26, 1896, in the seventy-fourth year of his age.

Mr. Schacht was one of the best-known pharmacists in England, and, by his death, the cause of pharmacy has sustained a distinct loss, for he was not only an accomplished practical pharmacist, but was earnestly devoted to the cause of pharmaceutical education.

We quote the following from the *Pharmaceutical Journal*, of January 2, 1897: "As a pioneer of pharmaceutical advancement, Schacht will long be remembered as having originated the idea which led to the foundation of the British Pharmaceutical Conference, for his advocacy of provision being made for provincial education, and of a compulsory curriculum.

"He joined the British Pharmaceutical Society in 1842, shortly after its organization, and served it officially in one capacity or another during a number of years. He was also a member of the Bristol Pharmaceutical Association, and had long been actively engaged in connection with the University College of Bristol, of which institution he was treasurer at the time of his death." He was a corresponding member of the Philadelphia College of Pharmacy.

Alonzo Robbins, Ph.M., a member of the Philadelphia College of Pharmacy, died suddenly at his home in this city, December 1, 1896. The deceased had been in ill health for more than a year, but the immediate cause of his death was an acute attack of pneumonia.

Mr. Robbins was born in Pottstown, Pa., about sixty-three years ago. He

graduated from the Philadelphia College of Pharmacy in 1855, was elected a member in 1868, and in 1878 became a member of its Board of Trustees.

After graduation he was engaged for the most part as a drug clerk until the close of the Civil War, when he engaged in the retail drug business for himself at Eleventh and Vine Streets, this city, where he remained until his death.

Mr. Robbins took an interest in all matters pertaining to pharmacy, and was an occasional contributor to this JOURNAL. He did considerable work in connection with the formation of the pharmaceutical laws of this State, and when the Board of Pharmacy was appointed, became, on June 23, 1887, its first president. This position he held until May, 1895, when he resigned.

No small share of credit was due him for his efforts in helping to found the Pennsylvania Pharmaceutical Association, of which he was a member. He was also a member of the American Pharmaceutical Association.

He was a member of the Committee of the Philadelphia College of Pharmacy for carrying on work for the Revision Committee of the 1880 Pharmacopœia. His subject was fluid extracts, and he performed a large number of experiments for determining the most satisfactory formulæ for these preparations.

Theodore George Wormley, M.D., Ph.D., LL.D., a member of the Faculty of the University of Pennsylvania, died at his home, in this city, January 3d, 1897, after an illness of about two months.

Prof. Wormley was born at Wormleysburg, Pa., in 1826. His collegiate training began at Dickinson College, Carlisle, Pa., where he spent several years, but left before the completion of his course in order to enter the Philadelphia College of Medicine, from which institution he graduated in 1849.

After graduation Dr. Wormley was engaged in the practice of his profession, first in Carlisle and then in Columbus, O., until 1852, when he was appointed professor of chemistry and the natural sciences in Capital University of that city, which position he held until July, 1865. In 1854 he received the appointment of professor of chemistry and toxicology in Starling Medical College, of the same city, and retained the position until 1877, when, in June of the latter year, he was chosen successor of Dr. Robert E. Rogers as professor of chemistry and toxicology, in the department of medicine of the University of Pennsylvania, which position he held until his decease.

During his professional career Dr. Wormley held many other positions of honor and trust, calling into account his abilities as a chemist and scientist. He was a member of a number of scientific bodies in this country and a Fellow of the Chemical Society of London.

His scientific papers were numerous, and quite a number of these were published in the AMERICAN JOURNAL OF PHARMACY. As long ago as 1870 a very valuable article of his, entitled "A Contribution to Our Knowledge of the Chemical Composition of Gelsemium Sempervirens," appeared in its columns. His last contribution to its pages was in 1894, on the subject of "Some Tests for Quinine."

His most notable work was his book, "Micro-Chemistry of Poisons," which was extensively reviewed by Professor Maisch in the September, 1867, number of this JOURNAL, and needs no comment here, other than to say that its value as a standard authority is recognized throughout the world.

Parthenium Hysterophorous. Flowering branch, three-quarters natural size. At side, flower heads about twice natural size.